NOTIFICATION

No. 94 /2016 Date : 29/09/2016

Subject :- Continuation of Prospectus No. 131738 prescribed for M.E. Civil (Structural Engg.) (F.T.) (CGS) for the session 2016-2017.

It is notified for general information of all concerned that the Prospectus No.131738 prescribed for M.E. Civil (Structural Engg.) (F.T.) (CGS) for the session 2014-2015 and continued for the session 2015-2016 shall be continued for the academic session 2016-2017 as per **Appendix – A** appended herewith as given below:-.

sd/-
(Dr.A.P.Deshmukh)
Registrar
Sant Gadge Baba Amravati University

Appendix – A

1SFSE1:

INTRODUCTION TO EARTHQUAKE AND RETROFITTING OF STRUCTURES

:Interior of earth, Engineering geology of earthquakes, platetectonics, Seismicity of the world, tectonic features of India,Faults, Propagation of earthquake waves, Quantification of earthquake (magnitude, energy, intensity of earthquake),Measurements of earthquake (Accelerograph, Accelerogramrecording), Determination of magnitude, Epicenter distance,focal depth, etc. Ground motion and their characteristics, Factors affecting ground motions, Guidelines for achieving efficient seismic resistant planning, selection of sites, importance of architectural features in earthquake resistant buildings, continuity of construction, Projection & suspended parts, special construction features like separation of adjoining structure, Crumble section, Stair case etc, Twisting of building, seismic effects on structures, inertia forces, horizontal & vertical shaking.
:Non-Engineered structures: Behavior of masonry structureduring earthquake, bands & reinforcement in masonry building,openings in wall, importance of flexible structures.

:Concept of earthquake Resistant design, design philosophy,four virtues of EQRD: Stiffness, Strength, ductility and Configurations.
:Principles of Repairs and Retrofitting, Terminology in Repairs,Restoration, Strengthening and Rehabilitation, Criteria for Repairs, Restoration and Retrofitting; Repair Materials; In-situtesting methods for RC and masonry structures; Seismic Hazard Evaluation; Techniques of repair and retrofitting of masonry buildings; Seismic evaluation of RC building-Demand capacity method, Pushover analysis and performance based approach; Techniques of Repair and Retrofitting in RC buildings; Retrofitting of buildings by seismic base isolation and supplemental damping; One case study in retrofitting.

Reference Books:

1. Wakabayshi M.; Design of Earthquake Resistant Buildings, McGrawHill Books Company; 1986
2. Okamoto, S.; Introduction to Earthquake Engineering; University ofTokyo press; 2nd Edition; 1984
3. Kramer, S.L.; Geotechnical Earthquake Engineering; Prentice Hall;New Jersey; 1996
4. Bolt, B.A.; Earthquakes; W. H. Freeman & Company; NY; 1985.
5. AmitaSinhal, Understanding Earthquake Disasters,TataMcraw-HillPublishing Company Ltd.
6. P. N. Agrawal, Engineering Seismology ,Oxford & IBH PublishingCo Pvt .Ltd
7. Pankaj Agrawal& Manish Shrikhande, Earthquake Resistant Designof Structures, Prentice Hall India.
8. Duggal S. K., Earthquake Resistant Design of Structures, OxfordUniversity Press 2007.

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1SFSE2 : THEORY OF ELASTICTIY AND ELASTIC STABILITY

3D-cartesian: Elastic structure subjected to loads, body forces, surface forces, components of displacement, strain and stress at a point of 3D structure, Generalised Hookes law, isotropic, orthotropic material, stresses in terms of strains and vice-versa, stress equilibrium equations, boundary conditions, strain- displacement relations, principal stresses and principal planes, elastic constants.

2D-cartesian: Plane stress and plane strain conditions, stress-strain relations, strain displacement relations, strain- compatibility condition, stress-compatibility condition, bi- harmonic equilibrium equation, Airy stress function, principal stresses and strains.

Saint Venant principle, solution of simple problems in tension, bending, torsion, plate with small circular hole under tension.

Concept of stability, stable, unstable and neutral equilibrium, energy criteria, method of stability analysis.
Elastic buckling of columns, buckling of continuous beams,buckling of frames, neutral equilibrium method, matrix approach, moment distribution method. Buckling of thin rectangular plates.

Reference Books:

1. Timoshenko S. P., Theory of Elasticity, Tata McGraw Hill.
2. Timoshenko S. P. and Gere J. N., Theory of Elastic stability TataMcGraw Hill.
3. Alexander Chajes, Principle of Structural Stability.

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1SFSE3: MATRIX METHODS OF STRUCTURAL ANALYSIS

Flexibility method(structural approach), flexibility coefficients, generalized flexibility coefficients, static degree of indeterminacy, basic determinate structure, redundant, alternate choices of redundant and corresponding primary structures, matrix formulation, hand solution of simple problem on truss, beams, frames, grids up to three unknown.

Stiffness method(structural approach), stiffness coefficient, generalized stiffness coefficients, kinematic degree of indeterminacy, unknown joint displacements for various structures, joint equilibrium equations, hand solution for simple problems of beams, frames, trusses up to three unknowns.

Stiffness method(member approach), general strategy, member and structure coordinate system, force-displacement relations in member coordinates, member stiffness matrix, transformation of displacements and forces from member to structure coordinates and vice-versa, stiffness matrix referred to structure coordinate system, joint equilibrium equations using assembly procedure, large structures, boundary conditions. Application to beams, plane and space trusses, plane and space frames and grids. Programming aspects, flow charts, solution of equations, member end forces, free body diagram of members.
Memory problems, in-core solution techniques, assembly of stiffness matrix in full form, half band form and sky line storage, half band width, column height, diagonal address.

Data preparation for solution of structures by stiffness method (member approach), alternatives for data preparation, displacement codes, joint-displacement and element displacement code relations.

Reference Books:

1. Pandit G.S. and Gupta S.P., Structural Analysis A matrix approach,Tata McGraw Hill, New Delhi 1986
2. Gere J.M. and W.Weaver, Analysis of framed Structures, D.VanNostrand com. Inc.,Affiliated East West Press, 1965
3. Meghre A.S. and Deshmukh S.K., Matrix Methods of Structural Analysis, Charotar Publishing, Anand, India 2003.

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1SFSE4: STRUCTURAL DYNAMICS

Sources of vibration, types of excitations, Spring action and damping; Degrees of freedom; Application of Newton's laws, D'Alembert's principle, Single degree of freedom systems; Mathematical model of physical systems; free vibrations, damped free vibrations, critical damping, and response, periodic loading expressed in harmonics, dynamic load factor.

Single degree freedom system, response to impulsive loading, rectangular, triangular pulses, Duhamel Integral. Response to general dynamic loading, Numerical schemes such as Wilson- Theta, Newmark-Beta, constant linear acceleration & time domain and frequency domain analysis.

Multi-degree freedom system, stiffness and flexibility approaches, Lumped-mass matrix, free vibrations fundamental Frequencies and mode shapes, orthogonality of response to dynamic loading, Formulations of equations of motion, mode superposition method, modal matrix, numerical scheme of iteration method.

Vibration of Continuous Systems: Free vibrations of Continuous systems-axial and transverse vibration of bars / beams. Response of continuous systems to dynamic loads.Rayleigh- Ritz method.
Structural response to earthquake, Response spectrum design earth quake, IS code provisions for multistory frames.

Reference Books:

1. Chopra, A. K.; Dynamics of Structures; Prentice Hall; 1995
2. Clough, R.W.; &Penzin, J.; Dynamics of Structures; McGraw Hill;1993
3. Humar J. L.; Dynamics of Structures; Prentice Hall; 1990
4. Mario, Paz; Structural Dynamics; CBS Publ.; N-Delhi; 1995
5. Timoshenko, S.; Advanced Dynamics; McGraw Hill Book Co; NY;1948
6 . Meirovitch L.; Elements of Vibration Analysis; 2nd Edition; McGrawHill Int. Edition; Singapore; 1986
7. Biggs, J.M.; Introduction to Structural Dynamics; McGraw Hill; NY;1964.

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1SFSE5: EARTHQUAKE RESISTANT DESIGN OF REINFORCED CONCRETE SRUCTURES

Review of Limit State Design of RC members. Confinement of concrete Philosophy of earthquake resistant design, Ductility, Redundancy & Over strength, Damping, Supplemental Damping, Base Isolation, Codal Provisions. Seismic behavior of concrete, Beams (Flexural, Shear and torsion) Uni-axial and biaxial Beam-column (Axial, shear and moments)

Building frames, frame-shear wall buildings, Braced Buildings, Preliminary sizing and Mathematical modeling of buildings with different structural systems with and without diaphragms, Earthquake, wind and other (i.e. blast, snow) load calculations along with dead load and live loads and their combinations.

Special aspects in Multi-storied buildings: Effect of torsion,flexible first story, P-delta effect, effect of soil-structure interaction on building response, drift limitation.Analysis and Design of multi-storied buildings with masonry infill,

Reference Books:

1. Paulay T. and Prestiley M.J.N.; Seismic design of R C & Masonry Buildings; John Willey & Sons; Willey & Sons, 2nd Edition; 1999
2. Booth, E.; Concrete Structures in Earthquake Regions; Longman Higher Education; 1994.
3. Raynolds C.E.; Reinforced Concrete Design Handbook; 9th Edition;Rupa& Willey & Sons Willey & Sons Company; Calcutta; 1981
4. Raynolds, C.E.; Basic Reinforced Concrete Design; Vol.-II; Conc.Publications Ltd.; 1962
5. Fintel M.; Handbook of Concrete Engineering; 2nd Edition; CBS Publishers, Delhi ; 1986
6. Park and Paulay; Reinforced Concrete Structures, John Wiley and Sons
7. Duggal S. K., Earthquake Resistant Design of Structures, OxfordUniversity Press, 2007

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1SFSE6 : EARTHQUAKE RESISTANT DESIGN OF REINFORCED CONCRETE STRUCTURES -LAB

Complete Design calculations and Drawings to be developed for a multi-storied building based on the above syllabus.

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1SFSE7: COMPUTER AIDED ANALYSIS & DESIGN OF STRUCTURES - LAB

- Introduction to Computer systems and facilities. Operating systems, Software, Software development processes.
-Introduction to software packages like STAADPRO, STRUDS, SAP-2000,Etab and ANSYS

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2SFSE1: FINITE ELEMENT METHOD

Continuum structure, discretisation, nodes and elements,minimum potential energy theorem, relation to Rayleigh- Ritzmethod Interpolation, shape functions, one dimensional Lagrangian and first order Hermitian functions, Natural or local coordinate, Two dimensional shape functions, Lagrangian and Serendipity shapes, Area and volume coordinates.

Two dimensional plane stress and plane strain analysis,constant strain triangle, linear strain triangle, rectangle, stiffness matrix, nodal load matrix due to body forces.

Isoparametric elements, plane stress/strain analysis, coordinateand derivative transformation, formulations for four and eight noded element, extrapolation of stress, Gauss integration, locations and weightages of Gauss points.Three dimensional stress analysis using eight and twenty node disoparametric hexahedron, four noded tetrahedron. Ring type element for analysis of axisymmetric solids subjectedto axisymmetric loads only Thin plate bending element, C1 continuity, 12 d.o.f. ACM element, 16 d.o.f. Bogner Fox element.Thin shallow shells, cylindrical shell, axisymmetrical shell subjected to axisymmetric loads only, Conical frustum element. Plate bending elements for Mindlin plates, C0 continuity, four,eight and nine node disoparametric element, nodal loads dueto transverse load on element.Convergence, different types of convergence trends, condition for convergence, geometric isoparametry, continuity of displacement and derivatives along element edge. Programming aspects, geometry, connectivity, code number, alternate data types, half band, data preparation, flow chart,typical subroutines for assembly, shape functions, stiffness matrix solution of equation.

Reference Books:

1. O. C. Zienkiewing and R. L. Taylor, The finite element method, Vol.1and 2, McGraw Hills.
2. C.S.Krishnamoorthy, Finite Element Analysis, Theory and Programming., Tata McGraw Hills 1994.
3. R. D. Cook, Concept and application of finite element analysis, JohnWilley and Sons.
4. Bathe and Wilson, Numerical Methods of Structural analysis.
5. E.Hinton and D.R.J. Owen, Finite Element programming, Academic press.
6. A.D. Belegunda and T.R.Chandrupatla, Finite element method in engineering, pretile Hall.

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2SFSE 2: ADVANCED DESIGN OF STEEL STRUCTURES

Introduction to Allowable Stress Design, Plastic design, Limit state Design Loadings as per IRC, IS (IS: 800-2007, IS: 875 part1-V, IS: 1893) applicable to various steel structures.Welded and riveted connections.Design of Beams, Beam-column, Plate Girders.Industrial Buildings including crane girders.Design of Foot Bridge and Introduction to Composite structures.Analysis and Design of Multistory building subjected to Seismic and Wind forces.

Reference Books:

1 Owens, G.W. & Knowles, P.R.; Steel Designers Manual; Blackwell;1994
2. Gaylords E.H. &Gaylords, C. N.; Design of Steel Structures; McGrawHill Publ.1998
3. Steel Design Manual; ELBS and Granada Publishers; London
4. Johnson, R.P.; Composite Structures of Steel and Concrete; Volume-I; Granado Publishing Ltd.; London; 1975
5. Salmon and Johnson; Steel Structures – Design and Behaviour,Harper and Collins Publishers.
6. Subramanian N., Design of Steel Structures, Oxford University Press,2008.
7. IS 800-2007, BIS.
8. Duggal S.K., Limit State Design of Steel Structures, Tata McGrawHill Education Private Limited.
9. Bavikatti S.S., Design of Steel Structures By Limit State Method AsPer IS:800-2007, I.K. International Publishing House Pvt. Ltd.
10. Subramanian N., Steel Structures Design and Practice, Oxford University Press, 2008

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2SFSE3: THEORY OF PLATES AND SHELLS

Governing differential equations of thin rectangular Plates with various boundary conditions and loadings.Introduction, Moment of curvature relation in pure bending,metrical bending of circular plates (Lateral loaded, uniformly loaded with clamped) Laterally loaded rectangular plates, Differential equation of the deflection surface (Lagrange's equation), Boundary conditions, simply supported plates under sinusoidal loading, Navier's solution.Finite differential method, differential equation to bent surface of anisotropic plate, Application to grid. General shell geometry, classifications, stress resultants,equilibrium equation, Membrane theory for family of shells (Parabolic, Quaternary, Cycloid, Circular, hyperbolic).Classical bending theories of cylindrical shells with and withoutedge beams, Finster Walder Theory, Schorer's Theory Approximate analysis & design of cylindrical shells.

Reference Books:

1.Timoshenko, S. P. &Kriegar, W.; Theory of Plates & Shells; McGrawHill; NY; 1970.

2. Szilard, R.; Theory and Analysis of Plates; Prentice Hall; 1974.

3. Novozhilov, V.V.; Thin Shells; Noordho of Groningen; 1964.

4. Ramaswamy G. S., Design of Concrete Shells; Krieger Publication Co.; 1984.

5.Chandrasekhar K.; Theory of Plates; University Press India Ltd.;Hyderabad; 1st Edn. 2001.

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2SFSE4: DESIGN OF PRESTRESSED CONCRETE STRUCTURES

1. Introduction to pre-stressing, Analysis for pre-stress, Load balancing. Partial pre-stressing, Grouting of beams, fire resistance of beams,special problems like stress corrosion, fatigue under dynamic loading etc. 3design for flexure (Type I structures), Introduction to Limit state method.
2 State of collapse: Shear, Bond, deflection & cracking in pre- stressed concrete member
3 Comprehensive design of a rectangular and/or a T-section by limit state method.
4 Poles, Piles and Sleepers.
5 Analysis of pre-stressed concrete pipes and circular tank.
6 Analysis and design of end block.
7 Comprehensive design of post-tensioned girders.
8 Analysis and design of continuous beams up to two spans linear transformation, concordant cable.
9 Analysis and design of portal frame, single storey and limited to two bays.

Reference Books:

1. Krishna Raju, N.; Prestressed Concrete Structures; TMH; Delhi; 1981.

2. Lin, T.Y. and Burns, N.H.; Design of Prestressed Concrete Structures; Edition; John Wiley & Sons; NY; 1981.

3. Ashok Jain, R. C. C. Design.

4. P. Dayaratnam, Prestressed Concrete Structures, Oxford & IBH.

5. Latest relevant BIS codes.

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2SFSE5 : Elective: (1)
SUBSTRUCTURES AND FOUNDATION DESIGN

Analysis and design of Piers, Abutments and Retaining walls. Shallow foundations: Individual and combined footings for axial and bending loads (Uniaxial and biaxial), Loss of contacts. Rafts, Annular Footings, Rigid and flexible foundations, Beams and slabs on elastic foundations. Deep Foundations: Piles and Wells foundations Design of Machine Foundations

Reference Books :

1. Hetenyi M.; Beam on Elastic foundation; University of Michigan Press; 1946
2. Bowles, J. E.; Foundation Analysis & Design; McGraw Hill; 5th Edition; 1996
3. Swami Saran; Soil Dynamics and Machine Foundations, Galgotia Publications (P) Ltd, New Delhi, 1999
4. Srinivasulu P, Vaidyanathan C V ; Handbook of Machine Foundation
5. Kurian N P; Modern Foundations – Introduction to advanced Techniques

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2SFSE5: Elective: (2)
EARTHQUAKE RESISTANT DESIGN OF BRIDGES AND DAMS

Performance in past earthquakes, Types of bridge superstructure and introduction to their design, sub-structure, bearings, IRC / IRS Bridge loadings and other codal recommendations, Performance of Bridges in past earthquakes. Seismic design philosophy for Bridges, State of art Modeling of bridges, Seismic Design of Substructures, Capacity design of substructures and ductile detailing, Seismic design of well and pile foundations.

Dams: Performance of concrete and masonry gravity dams, seismic design considerations, dynamic analysis of dams. Dam- foundation-reservoir interaction, bending, shear and finite element method of analysis.

Reference Books:

1 Chen W.F. and Duan L., Bridge engineering Handbook; CRC Press; 1999
2 Fintel, M.; Handbook of Concrete Engineering; 2nd Edition; CBS Publishers Delhi; 1986

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2SFSE5: Elective: (3) EXPERIMENTAL STRESS ANALYSIS

Photo elasticity: stress analysis by photo elasticity, light, polarization of light, Polaricsope, plane polaricsope, circular polaricsope, fringes, optics of polariscope, stress-optic law, isoclinics and isocromatics. D-photoelasticity, compensators and compensation technique, separation of principal stresses, analytical and experimental methods, typical model studies. 3D techniques, stress freezing, scattered light technique. Stress analysis by strain measurement, mechanical, optical, acoustical strain gauges, strain gradients. Electrical resistant strain gauges, various types, mounting of gauges, Rosette and rosette analysis, gauge factor, Wheatstone bridge, temperature compensation. Strain recording instruments, bridge configuration, and sensitivity, Model analysis, direct and indirect methods, prototype and model similarities, dimensional analysis, influence lines, beggs and other deformeter. Brittle coating method, Refringent coating method Moiré fringe method.

Reference Books:

1. Dally And Rally, Experimental Stress Analysis, Mcgraw Hill.
2. M-Frocht, Photoelasticity, John Wiley
3. Bungy S., Testing Of Concrete In Structure, Surrey University Press.

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2SFSE5: Elective: (4) DESIGN OF ENVIRONMENTAL STRUCTURE

Analysis and design of cylindrical shaped E.S.R, supported peripherally & internally making the tank floor a solid continuous slab system, Analysis and design of staging. Design of underground water tanks, swimming pools, Jacks well, Design of Water Treatment Plant units, aeration tank, Clari-floculator, flash mixers. Design of water sumps, filters, Design of digestion tank.

Reference Books:

1. Paulay T. & Park R.; Reinforced Concrete structures; John Willey & Sons
2. Krishna Raju N., Advanced R.C.C. Design, Tata McGraw Hill, New Delhi
3. Reynolds C.E.; Reinforced Concrete Design Handbook; 9th Edition; Rupa & Comp.; Calcutta; 1981
4. Punmia B. C., R. C. C. Design, Laxmi publications
5. Datta N. P., Waste Water Treatment, Oxford & IBH Publication

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2SFSE6 ADVANCED DESIGN OF STEEL STRUCTURES: LAB

Complete Design calculations and Drawings to be developed for the following structures based on syllabus for the relevant theory subject (2SFSE2)

1. Design of a steel bridge
2. Design of an Industrial shed.

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2SFSE7 DESIGN OF PRESTRESSED CONCRETE STRUCTURES : LAB

Complete Design calculations and Drawings to be developed for the following structures based on syllabus for the relevant theory subject (2SFSE4)

1. Comprehensive design of a pre-tensioned Pole
2. Comprehensive design of a post-tensioned Girder
3. Field visit report

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3SFSE1 & 4SFSE1 SEMINAR AND DISSERTATION

A Dissertation on Recent Trends in Structural Engineering to be submitted. Marks shall be based on Seminar, dissertation and Viva-Voce on dissertation.

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NOTIFICATION

No. 95 /2016 Date : 29/09/2016

Subject :- Continuation of Prospectus No. 151736 prescribed for M.E. Electrical (Incl. E.P.S.) (F.T.) (CGS) for the session 2016-2017.

It is notified for general information of all concerned that the Prospectus No.151736 prescribed for M.E. Electrical (Incl.E.P.S.) (F.T.) (CGS) for the session 2014-2015 and continued for the session 2015-2016 shall be continued for the academic session 2016-2017 as per **Appendix – A** appended herewith as given below:-.

sd/-
(Dr.A.P.Deshmukh)
Registrar
Sant Gadge Baba Amravati University

Appendix – A

EP2101 ADVANCED CONTROL SYSTEMS

Pre-requisite: Control System, Digital Signal Processing, Signals and System
Objecives: To familiarize with the detail concepts of digital control theory and design

Details of Course:

Unit I :
Signal Processing in Digital Control: Configuration of the Basic Digital Control Scheme, Principles of Signal Conversion, Basic Discrete-Time Signals, Time-Domain Models for Discrete-Time Systems, z-transform, Transfer Function Models, Frequency Response, Stability on the z-plane and the Jury stability criterion, Sample-and-Hold Systems, Sampled Spectra and Aliasing, Reconstruction of Analog Signals, Principles of Discretization.

Unit II :
Models of Digital Control Devices and Systems: z-domain description of Sampled Continuous-Time Plants, z-domain description of Systems with Dead-Time, Implementation of Digital Controllers, Tunable PID Controllers, Digital Temperature Control System, Digital Position Control System, Stepping Motors and their Control.

Unit III :
Design of Digital Control Algorithms: Introduction, z-plane specifications of Control System Design, Digital Compensator design using Frequency Response Plots, Digital Compensator design using Root Locus Plots, z-plane Synthesis.

Unit IV :
Control System Analysis Using State Variable Methods: Vectors and Matrices, State Variable Representation, Conversion of state variable models to transfer functions, Conversion of transfer functions to Canonical State Variable Models, Eigen values and Eigen vectors, Solution of state equations, Concepts of Controllability and Observability.

Unit V :

State Variable Analysis of Digital Control Systems: State descriptions of Digital Processors, State Description of Sampled Continuous-Time Plants, State Description of Systems with Dead-Time, Solution of State Difference Equations, Controllability and Observability, Multivariable Systems.

Unit VI :

Pole-Placement Design and State Observers: Stability Improvement by State Feedback, Necessary and Sufficient Conditions for arbitrary Pole-Placement, State Regulator 94 95 Design, Design of State
Observers, State Feedback with Integral Control, Digital Control Systems with State Feedback.

Text Book:
M. Gopal, Digital Control and State Variable Techniques, TMH.

Reference Books:
1. Katsuhiko Ogata Digital Control Engineering, PHI.
2. Kuo B. C. Digital Control Systems, Wiley & Sons
3. M. Sami Fadali, Antonio Visioli, Digital Control Engineering: Analysis and Design , AP.

EP2102 COMPUTER AIDED POWER SYSTEM ANALYSIS

Pre-requisite: Nil

Objective:

To familiarize with the computer aided methods for power system analysis.

Details of Course:

Unit-I :
Modeling of Power System Components, Basic Concepts : Single Phase, Three Phase Models, Matrix Representation of Networks, Bus Admittance Matrix, Bus Impedance Matrix, Graph Theory.

Unit-II :
Load Flow Analysis, Formulation of Load Flow Problem, Solution Techniques, Newton-raphson Method, De-coupled, Fast De-coupled Methods, Short Circuit Analysis, Effect of Short Circuits

Unit-III :
Types of Faults, Symmetrical Components, Sequence Networks, Balance and Unbalanced Fault Analysis, Computer Programming Aspects: Considerations for Large System Analysis, Sparse Matrix Techniques, Optimal Ordering of Nodes

Unit-IV :
State Estimation in Power System, Maximum Likelihood Concepts, Weighted Least-Squares, State Estimation Technique, Detection and Identification of Bad Measurements, Network Observability

Unit-V :
Reactive Power Allocation and Scheduling: Sources of reactive power, reactive power capability curve, FACT devices, modeling of reactive power allocation problem, solution techniques

Unit-VI :
Concept of Load frequency control and its applications., Concept of Optimal hydrothermal scheduling and its applications, Artificial Intelligence applications, Concepts of parallel computing

Text Book :

1. O.I.Elgerd, Electric Energy Systems Theory, McGraw Hill, 1971

References:

1. J. J. Grainger and W.D. Stevenson, Power System Analysis, McGraw Hill, 1994
2. G.W. Stagg and A. H. EI-Abiad, Computer methods in Power System Analysis, McGraw Hill 1968
3. I.J. Nagrath and D.P.Kothari, Modern Power System Analysis, Tata McGraw Hill, 1980

EP2103 DIGITAL SIGNAL PROCESSING AND APPLICATIONS

Pre-requisite: Signals & Systems.

Objective: To familiarize the students with the concepts of 1-D and 2-D signals, design of 1-D and 2-D filters, 1-D and 2-D power spectrum and various aspects of image processing

Details of Course :

Unit I:
Signals, systems and signal processing, classification of signal concept of discrete time signals, sampling of analog signal and sampling theorem, anatomy of digital filter.

Unit II:
Classification , analysis of discrete time signals and systems, implementation of discrete time systems, correlation of discrete time signals, z -transform and its application to the analysis of linear time invariant systems

Unit III:
Frequency domain sampling, Definition and properties of DTFT and DFT and their inverses, efficient computation of DFT : FFT algorithms: DIT and DIF, Quantization effects in the computation of the DFT

Unit IV:
Structures of FIR and IIR filters, design of FIR filters using windows; Optimum approximations of FIR filters using Parks- McClellan algorithm, Analog low pass filter design. Anti-Aliasing filter design. Design of IIR filters from analog filters by bilinear transformations; impulse invariance method.

Unit V:
Multi-rate digital signal processing. Poly-phase decomposition, multistage decimators and interpolators, Digital filter banks.Adaptive filtering, minimum mean square error criterion, Wiener filter, LMS adaptive algorithm

Unit VI:

Applications of Digital Signal Processing in power system, power electronics , Instrumentation , Speech and Radar signal processing.

Text Book :
1. Proakis-Manolakis, Digital signal Processing, 3rd edition, PHI, 2000

References:
1. Sanjit Mitra, Digital Signal processing, McGraw-Hill Science/Engineering/Math; 3rd edition, 2005.
2. Oppenheim-Schetor, Discrete time signal processing, 2nd edition, Prectice Hall, 1997.
3. Rabiner-Gold, Theory & application of digital signal processing, PHI, 1992 .

EP2104 ADVANCED ELECTRIC DRIVES

Pre-requisite: Knowledge of Power Electronics and Electric Drives

Objective:

To provide state-of-the-art speed control techniques used in modern ac drives, fed from CI/VSI/CSI, for superior high-performance requirements

Details of Course:

Unit I:
Introduction: Definition of electric drive, types of load; Speed torque characteristic of driven unit/loads, motors, steady state and transient stability of drives; Classification and components of load torque; Selection of motor power capacity for different duty cycles

Unit II :
Methods of DC motor control, non-regenerative controlled rectifiers, fully controlled converters, field control, Switching systems for DC motors, chopper regulators, aspects of analysis, performance and stability of variable speed dc drives

Unit III:
Induction motor control systems, AC regulators and static switches, control of effective rotor resistance, recovery of slip energy, variable frequency control of ac motors,

Unit IV:
Current source inverter fed Induction motor drive, forced commutated inverter fed drives, self-controlled synchronous motor drives and traction drives, Slip Power Controlled AC Drives: Static rotor resistance control, static Kramer drive

Unit V:
Analysis, performance and stability of synchronous and asynchronous drives, Solar and battery powered drives.

Unit VI:
Inverter fed AC Drives: Constant V/f controlled induction motors, controlled current and controlled slip operations; variable frequency controlled induction motor drives; PWM inverter drives.

Text Book :
1. W. Leonhard, Control of Electric Drives, Springer Verlag, 1985

References :
1. P.Vas, Vector Control of ac Machines, Clarendon press, , 1990
2. S.K.Pillai, Analysis of Thyristor Power Conditioned Motors, University Press, 1992
3. G.K.Dubey, Fundamentals of Electrical Drives, Narosa Publications, 1995.

EP2105 DIGITAL PROTECTION OF POWER SYSTEMS

Pre-requisite: Knowledge of Power System
Objective:
To develop ability and skill to design feasible protection needed for power system
Details of Course:
Unit I:
Introduction, block diagram of numerical relay, sampling theorem, correlation with a reference wave, least error squared (LES) technique, digital filtering, and numerical over- current protection. Vector surge and df/dt digital relays.
Unit II:
Introduction, Protection scheme of transmission line, distance relays, traveling wave relays, digital protection scheme based upon fundamental signal, hardware design, software design, digital protection of EHV/UHV transmission line based upon traveling wave phenomenon, new relaying scheme using amplitude comparison.
Unit III:
Introduction, faults in synchronous generator, protection schemes for synchronous generator, digital protection of synchronous generator

Unit IV:
Introduction, faults in a transformer, schemes used for transformer protection, digital protection of transformer.
Unit V:
Directional instantaneous IDMT over current relay, directional multi-zone instantaneous relay,distance relay setting, co-ordination of distance relays, co-ordination of over current relays,computer graphics display, man-machine interface subsystem, integrated operation of nationalpower system, application of computer graphics.
Unit VI:
Types of faults, assumptions, development of algorithm for S.C. studies, PC based integrated software for S.C. studies, transformation to component quantities, S.C. studies of multiphase systems. Ultra high speed protective relays for high voltage long transmission line.

Text Book :
1. Digital Protection - L. P. Singh, (New Age International (P) Limited Publishers, New Delhi, 2nd Edition)
References :
1.. Transmission Network Protection - Paithankar (Marcel & Dekker, New York)
2**.** Protective Relaying for Power System II Stanley Horowitz (IEEE press, New York)

SEMESTER – II

EP2201 POWER SYSTEM DYNAMICS AND CONTROL

Pre-requisite: Knowledge of Power System.

Objective:
To introduce the engineering and economic aspects of planning, operation, controlling power generation and transmission systems in electric utilities.
Details of Course:
Unit I:
Power system stability states of operation and system security, system dynamics problems, system model, analysis of steady State stability and transient stability, simplified representation of Excitation control
Unit II:
Modelling of power system components for stability studies:Generators, transmission lines, Excitation and prime mover controllers, flexible AC transmission (FACTS) controllers
Unit III:
Analysis of single machine and multi-machine systems. Small signal angle instability (low frequency oscillations): damping and synchronizing torque analysis,

Unit IV:
Eigenvalue analysis.;Mitigation using power system stabilizers and supplementary modulation control of FACTS devices.Excitation System Modeling, Standard Block Diagram, System Representation by State Equations

Unit V:
Small signal angle instability (sub-synchronous frequency oscillations): analysis and counter-measures. Transient Instability: Analysis using digital simulation and energy function method.

Unit VI:
Transient stability controllers. Introduction to voltage Instability. Analysis of voltage Instability.

Text Book :
1. P.Kundur, Power System Stability and Control, McGraw Hill Inc, New York, 1995.

References :
1. P.Sauer & M.A.Pai, Power System Dynamics & Stability, Prentice Hall, 1997.
2. K.R.Padiyar Power System Dynamics, Stability & Control, Interline Publishers, Bangalore, 1996.

EP2202 ELECTRICAL MACHINE : ANALYSIS & CONTROL

Pre-requisite: Knowledge of Electrical Machines.
Objective:
To present a general theory of rotating electrical machines and the development of Mathematical model of the 3-phase balanced machines in arbitrary reference frame and in field oriented reference frame for transient and steady-state performance of ac machines.

Details of Course:
Unit I:
Essentials of rotating electrical machines, Conventional analysis of electrical machines.The basic two pole machine transformer with a movable secondary. Transformer and speed voltages in armature, Kron's primitive machine.
Unit II:
Linear Transformation n Machines: Invarience of power, transformation from a displaced brush-axis. Transformation from from(a,b,c &α,β,0),transformation from rotating axis(α,β,0) to stationery axis(d,q,0), Physical concept of park's transformation, applied generalised theory, and electric torque, DC,machines and its speed control

Unit III:

Three phase induction motor- transformation methods, (stationary, rotor and synchronous frames) and corresponding equivalent circuits.

Unit IV:

Three Phase synchronous motor: representation, Park transformation. Drives, various Control techniques. Concept of Space vector, field oriented control and direct torque control of Induction Motor.

Unit V:

Permanent magnet synchronous motors- machine model (d-q) and control methods Switched reluctance motor drive, Various power circuit configurations and control.

Unit VI:

Steady state and transient performance, Phasor diagram and power angle characteristics,
Symmetrical and asymmetrical short circuit analysis, Measurement of reactances and time constants

Text Book :

1.C.V. Jones, The Unified Theory of Electrical Machines, Butterworth, London, 1967

References:

1. P.Vas, Vector Control of A.C. Machines, Clarendon Press, Oxford 1990
2. J.M.D. Murphy & F.G. Turnbull, Power Electronic Control of AC motors, Pergamon Press, 1988
3. W. Leonhard, Control of Electrical Drives, Springer Verlag, 1985.

EP2203 POWER QUALITY IMPROVEMENT TECHNIQUES

Pre-requisite: Power Electronics, Power Systems.

Objective:

To familiarize students with the reasons of load generated harmonics present in the supply and the methods for their suppression.

Details of Course:

Unit I:

Concept of Power Quality: Frequency variations, voltage variations- sag and swell, waveform distortion –dc offset, harmonics, inter-harmonics, notching and noise.

Unit II:

Fundamentals of Harmonics: Representation of harmonics, waveform, harmonic power, measures of harmonic distortion; Current and voltage limits of harmonic distortions: IEEE, IEC, EN,NORSOK .

Unit III:

Causes of Harmonics: 2-pulse, 6-pulse and 12-pulse converter configurations, input current waveforms and their harmonic spectrum; Input supply harmonics of AC regulator, integral cycle control, cycloconverter, transformer, rotating machines, ARC furnace.

Unit IV:

Effect of Harmonics: Parallel and series resonance, effect of harmonics on static power plant – transmission lines, transformers, capacitor banks, rotating machines, harmonic interference with ripple control systems, power system protection, consumer equipments and communication systems, power measurement.

Unit V:

Elimination/ Suppression of Harmonics: High power factor converter, multi-pulse converters using transformer connections (delta, polygon) Passive Filters: Types of passive filters, single tuned and high pass filters, filter design criteria, double tuned filters, damped filters.

Unit VI:

Active Power Filters: Compensation principle, classification of active filters by objective, system configuration, power circuit and control strategy. PWM Inverter: Voltage sourced active filter, current sourced active filter, constant frequency control, constant tolerance band control, variable tolerance band control.

Text Book :

1.Derek A. P., “Power Electronic Converter Harmonics”, IEEE Press.1989

References:

1. Arrillaga J., Smith B. C., Watson N. R. and Wood A. R., “Power System Harmonic Analysis”, 2nd Ed., Wiley India.2008
2. Arthur R. B., “Power System Analysis”, 2nd Ed., Pearson Education.2008
3. Arrillaga J., Braedlley D. A. and Bodger P. S., “Power System Harmonics”, John Wiley and Sons.

EP2204 HVDC TRANSMISSION

Pre-requisite: Knowledge of power system and power electronics

Objective:

To provide an in-depth understanding of different aspects of high voltage direct current power transmission system.

Details of Course:

Unit I:
Need for HVDC, Comparative analysis of AC and DC high voltage systems, Applications of AC and DC high voltage systems. EHVAC Transmission System: Sequence impedance calculation,

Unit II:
Calculation of transmission line parameters and sequence impedances for lines with ground returns, lines with bundle conductors and ground returns, sequence networks for various three phase transformer connections

Unit III:
Converters and their characteristics. Control of the converters (CC and CEA),and characteristics. Equivalence of a dc system in an AC system. Per unit systems.

Unit IV:
Parallel and series operation of converters. Load flow analysis of Alternating Current and Direct Current..

Unit V:
Corona: Basic phenomenon and calculation of voltage gradient of conductors, power loss, audible noise and radio interference due to corona, electrostatic field of EHV lines

Unit VI:
Lightning Phenomenon: Charge formation in clouds: Wilson's theory, Simpson's theory; Mechanism of lightning: stepped leader, return stroke, multiple strokes.

Text Book:

1. K.R. Padiyar, HVDC Power Transmission Systems, Wiley eastern Ltd. 1990.

References:

1. I. Arillaga, C.P. Arnold and B.J. Haskar, Computer Modelling of Electrical Power Systems, John Wiley, 1993.
2. Papers form IEEE Transactions on Power Apparatus and Systems, and Power Systems.
3. Digital Relay / Numerical relays – T.S.M. Rao, Tata McGraw Hill, New Delhi.

EP2205 APPLICATION OF POWER ELECTRONICS TO POWER SYSTEMS

Pre-requisite: Power Electronics, Power Systems.

Objective: To introduce to students the advanced knowledge in FACTS systems and their interaction with the problems of electric energy quality

Details of Course:

Unit I:
Analysis of uncompensated AC line, Passive reactive power compensation, Compensation by a series capacitor connected at the mid point of the line, Effect on Power Transfer capacity, Compensation by SSSC

Unit II:
Steady state and dynamic problems in Alternating Current systems. Flexible AC transmission systems (FACTS).Principles of series and shunt compensation. Description of static var compensators (SVC), Thyristor Controlled series compensators (TCSC), Static phase shifters (SPS),

Unit III:
Static condenser (STATCON), Static synchronous series compensator (SSSC) and Unified power flow controller (UPFC). Compensation by Static Condensor

Unit IV:
Modelling and Analysis of FACTS controllers. Control strategies to improve system stability.;Power Quality problems in distribution systems, harmonics, harmonics creating loads, modelling, harmonic propagation,

Unit V:
Series and parallel resonances, harmonic power flow, Mitigation of harmonics, filters, passive filters, Active filters, shunt, series hybrid filters, voltage sags & swells, voltage flicker.

Unit VI:
Mitigation of power quality problems using power electronic conditioners. IEEE standards.
Operation of UPFC, Control & Protection, Modelling, Applications of UPFC

Text Book:

1. G.T. Heydt, Power Quality, Stars in a Circle Publications, Indiana, 1991.

References:

1. T.J.E. Miller, Static Reactive Power Compensation, John Wiley & Sons, New York, 1982.
2. Recent publications on Power Systems and Power Delivery.

EP2116 POWER SYSTEMS LAB- I

This is a laboratory based on computer simulation and hardware experiments consisting of power flow studies, shunt compensation, and transmission lines.---

EP2216 POWER SYSTEMS LAB- II

This is a laboratory based on computer simulation and hardware experiments consisting of fault studies, regulation of transformer, FACTS, UPFC and control of reactive power.

EP2231 & EP2241 DISSERTATION & SEMINAR

A Dissertation on Electrical Engineering (E.P.S.) to be submitted. Marks shall be based on Seminar, Dissertation and Viva-V dissertation.

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SANT GADGE BABA AMRAVATI UNIVERSITY GAZETTE

Official Publication of Sant Gadge Baba Amravati University

PART - TWO

(Extra-Ordinary)

Monday, the 3 rd October, 2016

NOTIFICATION

No. 96 /2016 Date : 03 /10/2016

Subject : Continuation of Prospectus of examinations in the Faculty of Engineering & Technology for the academic session 2016-2017.

It is notified for general information of all concerned that the syllabi prescribed for the session 2015-2016 as shown under Column No. 2 in the Faculty of Engineering & Technology bearing numbers mentioned in Column No. 3 of the following table shall be continued for the session 2016-2017 as shown under Column No.4 of the said table for the respective examinations mentioned in Column No. 2 of the said table.

TABLE

Sr. No	Name of the Examination	Prospectus No. & Year of printing	Cotinued for the session/Exam. (As it is /with Notification/ Reguln./Ordinance/Direction No.
1	2	3	4
1	B.Arch. I & II Semester (CGS)	121721	2016-2017 (As it is)
2	First Year B.E. Civil (Part Time)	111728	2016-2017 (As it is)
3	Second & Third Year B.E. Civil (Part Time)	081729	2016-2017 (As it is)
4	Final Year B.E. Civil (Part Time)	091730	2016-2017 (As it is)
5	I & II Sem.B.E./B.Text./B.Tech.(C.E.), B.Tech. (Chem.Tech.) Poly(Plastic) (CGS)	11171	2016-2017 (along with Notificn. No.93 /2016)
6	I & II Sem. B.Tech.(Chem.Tech.) (FPOPC) (CGS)	111731	2016-2017 (along with Dirn.No. 19/2016)
7	B.E./B.Arch./B.Text./B.Tech. Sem.III & IV (CGS) [Prodn,Architecture,Text,Chem.,B.Tech.(Poly) (Plastic),B.Tech.(Chem.Tech.)(FPOPC), Biomed.]	121712	2016-2017(along with Notn.No. No.91/2016 &Dirn. No.19/2016)
8	B.E.Sem.III & IV(CGS)[Civil,Mech.,Electrical (E & P),Electrical & Electronics, Electrical (E & P), Electrical Engg.,Electro. & Tele., Electronics, Instrumentn.Comp. Sci. &Engg., Comp.Engg., I.T.]	121741	2016-2017 (along with Notificn. No. 91 /2016)
9	B.E./B.Text.E.,B.Tech. Sem. V & VI (CGS) [Prodn.Electro. &Tele.,Electronics,Comp.Sci. & Engg.,Comp.Engg.,Textile,Chem.Engg.,Chem.Tech. (Poly)(Plast.), Chem.Tech.(FPOPC)]	131712	2016-2017 (along with Dirn.No. 20/2016)
10	B.E.Sem. V & VI(CGS) [Civil,Mechanical, Electrical (E & P),Electrical & Electronics, Electrical (E & P),Electrical ,I.T. ,Architecture, Instrumentation, Biomedical Engg.]	131741	2016-2017 ((along with Dir.No. 20/2016)
11	P.G.D.C.S.	111724	2016-2017 (As it is)
12	Master in Computer Applicn. I Year(CGS)	111722	2016-2017 (As it is)
13	Master in Computer Applicn. II & III Year(CGS)	121718	2016-2017 (As it is)
14	Master of Engineering (Part Time) I to III Year (CGS)[M.E.Civil(Geotech.,E.P.S., thermal Power Engg.,Env.Engg.,Comp.Sci. & Engg.,Prodn.Tech. & Mgmt.,Digital Electronics]	117534	2016-2017 (As it is)
15	Master of Engineering (P. T.) I .T. (CGS)	131737	2016-2017 (As it is)
16	Master of Engineering [E.P.S.,Env.Engg., Comp.Sci. & Eng., Prodn.(P. T.) I .T. (CGS)	111737	2016-2017 (“Excluding Digital Electronics)
17	M.E./M.Tech.(F.T.)(CGS) [Mech (CAD/CAM, Digital Electro.,Electrical (E.P.S.),M.Tech.(Chem. Tech.)(Memb. & Seprn.Tech.) Chem.Engg., Comp.Sci.& Engg.,I.T.,Electro. & Tel.Comp.Engg.]	151736	2016-2017 (along with Notn.No. 95/2016 & Dirn.No. 21/2016)

18	M.E.(F.T.) (CGS)[Electro. & Tel., Civil (Struc. Engg.),Civil (Transportn. Engg. &Mgmt.),Mech. (Thermal),Mech.(Adv.Manufac.&Mech.Syst.Design), Electrical & Electronics Engg.,Comp.Sci. & I.T.]	131736	2016-2017 [(Excluding syllabi of "M.E.Civil (Struc.Engg.)]
19	B.E./B.Arch. Semester VII , VIII,IX & X(CGS) [Civil,Mech.,Electrical (E & P),Electrical & Electro., Electrical (E & P),Electrical, Architecture, I.T., Biomedical Engg.]	141711	2016-2017 (as it is)
20	B.E./B.Text./B.Tech.Semester VII & VIII(CGS) [Prodn,Electro. & Tele.,Electronics, Instrumentn, Comp.Sci. & Engg.,Comp.Engg.,Textile, Chemical, Chem.Tech.(Poly)(Plast), Chem.Tech.(FPOPC)]	141712	2016-2017 (along with Notn.No. 92/2016 & Dirn. No.19/2016)
21	M.E.(F.T.)Civil (Const.Engg.),Electrical(E & P) CGS	141713	2016-2017 (As it is)
22	M. E.(F.T.) (CGS) Civil (Struc.Engg.)	131738	2016-2017 (alongwith Notn. No. 94/2016)
23	M.E.(P.T./F.T.)(CGS) [Digital Electro./Electronics & Telecommunications]	151739	2016-2017 (As it is)
24	M. E. Civil (Geotechnical Engg.)(F. T.) (CGS)	151740	2016-2017 (As it is)
25	M.Sc. Applied Electronics Semester I to IV(CGS)	111734	2016-2017 (As it is)

sd/-
(Dr.Ajay P.Deshmukh)
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