Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department:Civil Engineering

1) Research/Specialization Group: Transportation Engineering

Course Code & Course Name: CE 518: Highway Materials, CE 520: Pavement Design and Analysis,

CE 588 Sustainable Materials and Low cost Construction

Syllabus Content Subgrade properties, Highway materials, Bituminous mixes, Flexible pavements, Design of flexible pavements, low cost pavement, Sustainable Development and Life cycle Assessment

Signatures and Names of DRC Members:

1. Dr. P.K. Gautam,
   Assistant Professor, CE Department

2. Dr. D.K. Sarma, 19/7/24
   Professor, ME Department

3. Dr. H.M. Kalita, 19/07/2024
   Assistant Professor, CE Department

4. Dr. S. Sahoo 19/07/2024
   Assistant Professor, CE Department

5. Dr. M.L. Patton
   Associate Professor, CE Department

6. Dr. D. Podder,
   Assistant Professor, CE Department

7. Dr. Susmita Sharma 19/7/24
   Assistant Professor, CE Department

Signature of DRC Chairman (I/C)
Date 19/07/2024

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: Civil Engineering

1) Research/Specialization Group: Geotechnical Engineering

Course Code & Course Name:**CE 564 Advance Foundation Engineering**

Bearing capacity theories (Terzaghi's, Meyerhoff's, Hansen's, Vesic's, Balla's)- foundations subjected to centric vertical loads, inclined loads, eccentric loads, foundations on layered soils, anisotropic soils, foundations on slopes, over voids, interference of footings. SHALLOW FOUNDATIONSSettlement analysis- components of settlement, elastic settlement, flexible and rigid footings, contact pressure distribution, prediction of elastic parameters from SPT, CPT and other field tests, consolidation settlement, differential settlement. Design of individual footings, strip footing, combined footing, rigid and flexible mat, buoyancy raft, basement raft, underpinning.PILE FOUNDATIONS Estimation of load carrying capacity of single and pile group under various loading conditions. Pile load testing (static, dynamic methods and data interpretation), settlement of pile foundation, code provisions, design of single pile and pile groups, and pile caps. Load transfer mechanism, Pile capacity in various soil types, negative skin friction, group action, settlements, laterally loaded vertical piles, pile foundations on rocks. WELL FOUNDATIONS Types, components, construction methods, design methods (Terzaghi, IS and IRC approaches), check for stability, base pressure, side pressure and deflection.SPECIAL TOPICS Foundations on difficult sub-soils (collapsible and expansive soils) - Foundations for tall structures.

Signatures and Names of DRC Members:

1. Dr. P.K. Gautam,
   Assistant Professor, CE Department
2. Dr. D.K. Sarma, 19/7/24
   Professor, ME Department
3. Dr. H.M. Kalita, 19/07/2024
   Assistant Professor, CE Department

4. Dr. S. Sahoo 19/07/2024
   Assistant Professor, CE Department
5. Dr. M.L. Patton
   Associate Professor, CE Department
6. Dr. D. Podder,
   Assistant Professor, CE Department

7. Dr. Susmita Sharma, 19/7/24
   Assistant Professor, CE Department

Signature of DRC Chairman
Date 19/07/2024

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for Full Time & Sponsored Part Time)

Date of Comprehensive Exam: 16-08-2024

Department: Computer Science and Engineering

1) Research/Specialization Group: 1

(Name of the Group): Computer Network & Security

Syllabus Content { should be an extract from the course syllabus (not the entire syllabus) which will be helpful for the research work of the scholar }:

(a) Course Code and Course Name : *CS 305: Selected Topics in Computer Network syllabus:*
Medium Access Control: ALOHA, CSMA, CSMA/CD, token ring, token bus, Network Layer Addressing IP version 4 and 6, Intra- and Inter-domain Routing, Distance Vector Routing, Link State Routing Path Vector Routing, Multicast Routing Protocol.
Wireless communication, Fading, Hands off, Wireless multiple access protocols, Ad-Hoc network, MAC protocols, Network Layer Protocols, TCP over wireless applications, Mobile IP.

(b) Course Code and Course Name : *CS 416: Selected Topics in Wireless Sensor Network:*
Wireless Sensor Network, Coverage, Connectivity, longevity, scheduling, synchronizations in WSNs, WSN Hardware, Internet of Things, WSN Deployment, Routing Protocols for WSNs, Fault Tolerance, Network Protocols, Data Storage.

(b) Course Code and Course Name: *CS 322: Selected Topics in Network Security Syllabus:*
Security Architectures and Protocols, Distributed Denial-of-Service (DDoS) attacks and defence, Worm defence, Botnets defence, Security of IEEE 802.11 WLANs, Mobile malware detection and defence, Social network security and privacy, Security of mobile ad hoc networks, Security of wireless sensor networks, Security of vehicular networks, Security in cloud computing.

(c) Course Code and Course Name: *CS 517 : Soft Computing Syllabus:*
Fuzzy Sets and Membership Function, Fuzzy If-Then Rules, Fuzzy Models, Fuzzy Logic Controller, Neural Networks- Backpropagation, Extended Backpropagation for Recurrent Networks, Genetic Algorithm, Particle Swarm Optimization, Ant Colony Optimization.

(d) Course Code and Course Name: *CS 521 : Number Theory and Cryptography Syllabus:*
Mathematics of symmetric key and non-symmetric key cryptography, Encryption algorithms- DES, AES, hash functions-MD5, SHA, Signatures- RSA, ring signature, group signature, blind signature, aggregate signature, Elliptic curve Crytography.

(e) Course Code and Course Name: *CS 701 :Advanced Data Structures and Algorithms Syllabus:*
Array, Linked List, Stack, Queue, Double-Ended Queue, Search Trees, Height-Balanced Trees (or AVL Trees), Weight-Balanced Trees, Red-Black Trees, Splay Trees, Skip List, Balanced Search Trees as Heaps, Hash Tables and Collision Resolution, Hash Functions, Hash Trees, Selection Sort, Bubble Sort, Mergesort, Quicksort, Heapsort, Bucket and Radix Sort, Basic Algorithm Paradigms – Divide and Conquer, Greedy Algorithms, Dynamic Programming with examples, Minimum Spanning Trees.

(f) Course Code and Course Name : *CS 519 : Cloud Computing Syllabus:*

Virtualization: Basic concept– Hypervisor- Types of virtualization- hardware, operating system, server, storage- Features of virtualization- Advantages and disadvantages of different types of virtualization. Cloud Architecture:Types of deployment models-Private, Public , Hybrid, Community, Types of service models-Iaas, PaaS, SaaS.

2) Research/Specialization Group: 2

(Name of the Group): Computer Vision and Computational Intelligence

Syllabus Content { should be an extract from the course syllabus (not the entire syllabus) which will be helpful for the research work of the scholar }

(a) Course Code and Course Name: *CS 511 : Image Processing Syllabus:*

Basics of Image processing:Visual Perception, Image Sampling and Quantization, Basic relationships between Pixels, Image File Format, Histogram Processing, Enhancement using Arithmetic/ Logic Operations, Smoothing and Sharpening Spatial Filters, Restoration in the presence of Noise only - Spatial Filtering, Inverse Filtering, Weiner Filtering.

Feature Selection and Feature Extraction - Probabilistic Separability based criterion functions, Interclass Distance based criterion functions, Branch and Bound algorithm, Sequential Forward/ Backward selection algorithms, (l, r) algorithm, Feature Extraction based on PCA, LDA.

(b) Course Code and Course Name: *CS 513 : Artificial Intelligence Syllabus:*

Basics of Artificial Intelligence: State Space Search, Uninformed Search - Breadth First Search, Depth First Search, Stochastic Search - Hill Climbing, Simulated Annealing, A*, AO*, Constraint Satisfaction Problems, First Order Predicate Logic, Planning - Goal Stack Planning, Overview of different forms of Learning: Unsupervised, Supervised, Semi-supervised

Pattern recognition basics: Classification - Bayesian Decision Rule, Minimum Distance Classifier, Mahalanobis distance, Maximum Likelihood Classification, kNN Classifier, Decision Tree, Artificial Neural Networks: Introduction to Expert Systems and Robotics

(c) Course Code and Course Name : *CS 519 : Cloud Computing Syllabus:*

Virtualization: Basic concept– Hypervisor- Types of virtualization- hardware, operating system, server, storage- Features of virtualization- Advantages and disadvantages of different types of virtualization. Cloud Architecture: Types of deployment models-Private, Public , Hybrid, Community, Types of service models-Iaas, PaaS, SaaS.

(d) Course Code and Course Name: *CS 701 :Advanced Data Structures and Algorithms Syllabus:*

Array, Linked List, Stack, Queue, Double-Ended Queue, Search Trees, Height-Balanced Trees (or AVL Trees), Weight-Balanced Trees, Red-Black Trees, Splay Trees, Skip List, Balanced Search Trees as Heaps, Hash Tables and Collision Resolution, Hash Functions, Hash Trees, Selection Sort, Bubble Sort, Mergesort, Quicksort, Heapsort, Bucket and Radix Sort, Basic Algorithm Paradigms – Divide and Conquer, Greedy Algorithms, Dynamic Programming with examples, Minimum Spanning Trees.

Signatures and Names of DRC Members:

1. _____ (Dr. D. S. Roy)
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Signature of DRC Chairman

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: EC

1) Research/Specialization Group: 1

(Name of the Group)__Micro Electronics_____

Course Code & Course Name: Digital VLSI Circuits, LOW POWER VLSI DESIGN

Syllabus Content : Physics of power dissipation in MOSFET devices, power dissipation in cmos, Power estimation using the input vector compaction, power dissipation in domino cmos, high level power estimation, Information theory based approaches, Behavioral Level Transforms, Logic Level Optimization for Low power, Circuit Design style, Leakage current in deep submicrometer transistors, Deep submicrometer device design issues, Key to minimizing SCE, Organization of a static RAM, MOS Static RAM Memory cell, Energy dissipation in transistor channel using an RC model, hot carrier effect, sub threshold conduction, Static CMOS inverter, performance of CMOS inverter, power consumption in CMOS logic gates, Domino CMOS logic, NPCMOS-logic style, static SR flip flop, Dynamic latches and registers, Addition/Subtraction, Comparators, Zero/One Detectors

2) Research/Specialization Group: 2

Research Group Name: Signal and Image Processing

1. **Biomedical Image Processing:**

Review of basic signals, systems and signal space: review of 1-D signals and systems, review of random signals, multi-dimensional signals. Signal representation: Transform theory and methods.
Various Medical images: X-ray and Computed Tomography (CT) imaging, Magnetic Resonance Imaging (MRI) Ultrasonic Imaging, Microscopic Imaging, Objectives of biomedical image analysis, and Difficulties in biomedical image acquisition and analysis.Gray scale thresholding, Contrast manipulation, histogram equalization, Laplacian derivatives, rank operators –textural analysis, Homomorphic filtering, Edge Detection, Optimal thresholding, Region-based segmentation (splitting and merging), K-means clustering based segmentation, Fuzzy based segmentation

Probability Distributions: Binary variable, multinomial variables, The Gaussian Distribution, The exponential family, Nonparametric methods. Neural Networks: Feed-forward Network Functions, Network Training, Error Backpropagation, Regularization in Neural Networks, Bayesian Neural Networks, Support vector machines (SVM), Mixture Models, EM algorithm, K-means Clustering, Mixtures of Gaussians, Principal Component Analysis.

Signal detection and estimation theory: Neyman-Pearson decision rules, likelihood ratio test (LRT), generalized matched filter, Minimum variance unbiased estimation, Fisher information matrix, Cramer-Rao bound

Course Code & Course Name: Concepts of Electronics and Communication (EC 701), Medical Image Analysis (EC 533), Machine Learning for Communications and signal processing (EC 546), Signal Detection and Estimation Theory (EC 548)

3) Research/Specialization Group: 3

(Name of the Group): RF Microwave and Communication

1. Communication:

Wireless communications and diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Diversity modeling for Wireless communications, BER Performance Improvement with diversity, Types of Diversity – Frequency, Time, Space. Broadband wireless channel modeling: WSSUS Channel Modeling, RMS Delay Spread, Doppler Fading, Jakes Model, Autocorrelation, Jakes Spectrum, Impact of Doppler Fading. Cellular communications: Introduction to Cellular Communications, Frequency reuse, multiple Access Technologies, Cellular Processes - Call Setup, Handover etc. MIMO: Introduction to MIMO, MIMO Channel Capacity, MIMO Spatial Multiplexing, MIMO Diversity, MIMO, OFDM. Neural Networks: Feed-forward Network Functions, Network Training, Error Backpropagation, The Hessian Matrix, Regularization in Neural Networks, Bayesian Neural Networks. Statistical Decision Theory: Bayesian, minimax, and Neyman-Pearson decision rules, likelihood ratio test (LRT), receiver operating characteristics, composite hypothesis testing, locally optimum tests, generalized LRT. Estimation of Signal Parameters: Minimum variance unbiased estimation, Fisher information matrix, Cramer-Rao bound, sufficient statistics, maximum likelihood estimation, minimum mean square error estimation, maximum a posteriori estimation.

Course Code & Course Name: Concepts of Electronics and Communication (EC 701), wireless and mobile communication (EC 527), Machine Learning for Communications and signal processing (EC 546), Signal Detection and Estimation Theory (EC548)

2. Microwave:

Microwave Frequency bands, Applications of Microwaves: Civil and Military, Medical, EMI/ EMC. Rectangular waveguide, Concept of Mode, Characteristics of TEM, TE and TM Modes, Losses associated with microwave transmission, Concept of Impedance in Microwave transmission, Field analysis of transmission line, Coaxial Line, Circular waveguide, Stripline, Microstrip Line, CPW Line, Equivalent Voltages and currents for non-TEM lines, Network parameters for microwave Circuits, Scattering Parameters.

Review of Maxwell's Equation; Condition of radiation of electromagnetic waves and introduction to Antenna; Vector Potential and Retarded Vector Potential; Radiation fields of a Hertzian dipole(electric); Duality Principle, Radiation fields due to short magnetic dipole. Antenna Characteristics: Radiation Pattern, Beam Width; Radiation Resistance and efficiency; Directivity and Gain, Impedance, VSWR, Polarization; Effective height and Receive Aperture; Noise Temperature of Antenna. Radiation fields and Characteristics of λ/2 dipole; discussion on λ/4 monopole antenna; Current distribution and Radiation patterns of center-fed dipoles of length λ, 3λ/2 and 2 λ. Horizontal and Vertical antennas over a plane ground, design and analysis of Microstrip Patch Antenna.

Waveguide, boundary conditions, maxwell equations, characteristics of modes TE , TM TEM, cavity model, basic parameters of antenna, filter, radiation pattern, polarization, RF instruments like VNA, SA, SG, Transmission line, couplers, Sparameters, Various architecture of passive components, Power feeding techniques, wireless power transfer

Course Code & Course Name: Microwave Engineering (EC 561), Antenna Theory and Propagation(EC 540)

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: ELECTRICAL ENGINEERING

1) Research/Specialization Group: 1

(Name of the Group): Power & Energy System

- **EE 515: Computer-Aided Power System Analysis**

Syllabus Content: Network modeling, Y-bus & Z-bus formation, power flow techniques, symmetrical domain components, unsymmetrical & symmetrical fault analysis, rotor angle stability, multi-machine swing equations, state estimation techniques, contingency analysis methods.

- **EE 513: Smart Grid Technology**

Syllabus Content: Concept of Smart Grid, Present development & International policies in Smart Grid, Real Prizing, Smart Appliances, Automatic Meter Reading(AMR), Smart Substations, Substation Automation, Feeder Automation, IEDs & their application for monitoring & protection, need & applications of microgrid, Information and Communication Technology for Smart Grid.

- **EE 502: Wide Area Monitoring System**

Syllabus Content: Basic architecture; basic principles for wide area monitoring and control in real-time; dynamic modelling of synchronous generator; transient stability monitoring and control; small signal monitoring and control; Fourier concepts and applications; sampling data and aliasing; phasor estimation of nominal frequency inputs; phasor estimation of off-nominal frequency inputs, single phase, multiphase, unbalanced systems, sequence components estimation; Generic PMU, global positioning system, phasor measurement systems, communication system for PMU's, functional requirements for PMU's and PDC's, International Standards for PMU and Tests for Compliance; Synchrophasor applications in power system protection and emergency control; optimal placement of phasor measurement units; Real-time monitoring and control of voltage stability

2) Research/Specialization Group: 2

(Name of the Group): Power Electronics & Drives

- **EE 503: Advanced Power Converter:**

Syllabus Content: Power semiconductor devices: diodes, thyristors, transistors. AC-DC converters, DC-DC converters, DC-AC inverters. Types of electric drives: DC drives, induction motor drives, synchronous motor drives. Control strategies for electric drives: V/f control, vector control, direct torque control. Motor control and battery management systems. Powertrain architectures and design considerations. Types of EVs: BEVs, PHEVs, HEVs, FCEVs. EV components: electric motors, batteries, power electronics. Types of chargers: Level 1, Level 2, and DC fast chargers. Charging standards and protocols: CHAdeMO, CCS, Tesla Supercharger. Site planning and installation of EV charging stations. Load management and peak demand. Vehicle-to-grid (V2G) technology and applications.

- **EE 504: Renewable & Distributed Energy Systems**

Syllabus Content: Solar, wind, hydro, geothermal, and biomass energy. Advantages and challenges of renewable energy sources. Grid-tied and off-grid systems. Energy storage systems: batteries, flywheels, supercapacitors. Case studies on renewable energy integration. Definition, components, and benefits. Types of microgrids: AC, DC, and hybrid. Energy management systems (EMS). Load forecasting and demand-side management. Features of smart microgrids: IoT, communication protocols. Role of smart meters and sensors. Cybersecurity in smart microgrids.

3) Research/Specialization Group: 3

(Name of the Group) Instrumentation, Control and Signal Processing

- **EE 521: Instrumentation and Control in Energy system**

Syllabus Content: Measurement Systems: Elements of generalized measurement system, input-output configuration of instruments and measurement systems, methods of correction for interfering and modifying inputs, static performance characteristics of measurement system, noise, signal to noise ratio, errors in measurement, Sensors and Transducers: Classification of transducers, passive transducers: resistive, inductive and capacitive transducers, active transducers: RTD, Thermistor, thermocouple, piezoelectric transducer, photoelectric, transducer, taco-generator, conditioning circuits for transducers

- **EE 510: Advanced Control Systems**

Syllabus Content: Continuous Time Systems in State-Space: Introduction of State-Space, modelling of dynamic systems. Concepts of Controllability, Observability, Stabilizability & Detectability. Design of state variable feedback, Regulator design via pole placement method, determination of full state feedback gain using Direct-comparison method, controllable canonical form method and Ackermann's formula. state observers, Design of Full order state observers, reduced order State observers. Non-Linear Control System: Introduction, Phase-Plane analysis: singular points, Phase portrait, Limit Cycle, Qualitative behaviour near equilibrium points, Jacobian linearization, Construction of phase trajectories using different method, Stability of non-linear system by Phase-Plane method. Lyapunov's Stability Analysis: Stability definitions, Lyapunov's stability criterion, Lyapunov function, sign definiteness of scalar functions, Sylvester's criterion, Lyapunov's Direct and In-direct methods for linear and nonlinear systems, Construction of Lyapunov function, Lyapunov based control design. Control design for some application like power systems, smart grid and renewable energy systems.

- **EE 512: Advanced Digital Signal Processing**

Syllabus Content: Fourier Transform, Digital Filter Design and Realization: Direct Evolution of DFT, Properties of DFT, Computational complexity analysis of DFT, Fast Fourier Transform, Radix-2 Decimation-In-Time FFT algorithm, Radix-2 Decimation-In-Frequency FFT algorithm, Computation complexity analysis of FFT algorithm, Basic concepts of FIR and IIR filters, design of linear phase FIR filters, FIR filter design using windows, Sampling method of filter design, Design of Butterworth and Chebyshev IIR analog filters, Analog-to-digital filter transformation methods; Impulse invariant, Approximation of derivatives, and Bilinear transform, Match z-transform, design of linear phase FIR filters, transformation of digital filters. Introduction to multi-rate DSP, decimation and interpolation, polyphase decomposition, uniform DFT filter banks, quadrature mirror filters and perfect reconstruction. Realization of FIR and IIR Filters, Transposed Structure, Transversal Structure, Cascade Structure, Linear Phase Realization, Lattice Structure, Polyphase Realization of FIR Filter, Direct Form-I Realization, Direct Form-II Realization, Parallel Form Structure.

Signatures and Names of DRC Members:

1. Prof. Gayadhar Panda _____
2. Dr. Sanjoy Debbarma _____
3. Dr. Rakesh Roy On Leave
4. Dr. Ksh Milan Singh On Leave
5. Dr. Piyush Pratap Singh Piyush 22/07/24
6. Dr. Bikash Kumar Sarkar 22/07/24

Signature of DRC Chairman

Date 22/07/24

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

Department: Mechanical Engineering

1) Research/Specialization Group: 1

(Name of the Group): Fluids & Thermal Engineering

Syllabi for: Jyotipriyam Baruah (P23ME001)

ME 701: Measurement Systems in Mechanical Engineering [100 Marks]

Basic Measurement Systems
To study the generalized and operational description of the general description of the measurement system, elimination method of Interfering inputs to the desired inputs, null and deflection methods of measurements, analog and digital measurements, calibration, performance characteristics, and frequency response.

Analysis of Experimental Data
Measurements error and uncertainty analysis, design of experiments, order of instruments and calibration, performance characteristics, frequency response.

Sensors and Transducers
Data sampling, signal conditioning and computer data acquisition. error response characteristic of sensors, measurement error.

Measurement of Process Variables
Pressure Measurement: Dynamic response, dead weight pressure tester, Bourdon gauge; low pressure measurement techniques-the McLeod gauge, Pirani thermal conductivity gauge, Knudsen gauge.

Flow Measurement: Positive displacement methods, flow obstruction methods, the sonic nozzle, hot wire and hot film anemometer, magnetic flow meter, flow visualization method, LDA.

Temperature Measurement: Temperature scales, the ideal gas thermometer, temperature measurement by mechanical effect, electrical effect, radiation, effect of heat transfer on radiation, transient response of thermal systems, thermocouples, temperature measurement in high-speed flow.

Measurement of force, Torque and Power.
To study the Measurement of force, Torque and Power using techniques like platform balance, force to displacement conversion, conversion of force to hydraulic pressure, piezoelectric force transducer. Electric generator as a dynamometer, Measurement of rotational speed,

Displacement Measurement:
To study the displacement measurement methods using Electric/electronic and optical techniques of displacement measurement.

References

1. J. P. Holman, "Experimental methods for Engineers", McGraw-Hill.
2. R. S. Sirohi and H. C. Radha Krishna, "Mechanical Measurements", Wiley.

Syllabi for: Rohit Pahariya (P23ME003)

ME502 - Convective Heat Transfer and Mass Transfer [25 Marks]

Introduction to Convection

Derivation of governing equations of momentum, energy and species transport, Order of magnitude analysis, Reynolds analogy.

Convective Heat Transfer in External and Internal Flows

Derivation of hydrodynamic and thermal boundary layer equations, Similarity solution techniques, Momentum and energy integral methods and their applications in flow over flat plates with low and high Prandtl number approximations. Introduction to turbulence, Reynolds averaging, Eddy viscosity and eddy thermal diffusivity. Concept of developing and fully developed flows.

Thermally Developing Flows

Graetz problem, Concept of thermally fully developed flow and its consequences under constant wall flux and constant wall temperature conditions, Steady forced convection in Hagen Poiseuille flow, Plane Poiseuille flow, and Couette flow and analytical evaluation of Nusselt numbers in limiting cases.

Free Convection

Free convection boundary layer equations: order of magnitude analysis, similarity solutions.

References:

1. F. P. Incropera & D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Willey & Sons.
2. A. Bejan,"Convective Heat Transfer", John Wiley and Sons.
3. Y. Cengel& A. Ghajar, "Heat and Mass Transfer", McGraw Hill (India) Pvt. Ltd

ME511 - Conduction and Radiation [25 Marks]

Introduction: Basic modes of heat transfer, heat transfer mechanisms and the governing laws.

Steady-state Conduction: One Dimensional Problems Fourier's law of heat conduction in Cartesian, cylindrical and spherical coordinates, heat conduction equations in isotropic and anisotropic materials: in Cartesian, cylindrical and spherical coordinate system, Initial and boundary conditions, 1-D conduction problems without and with heat generation: plane wall, hollow cylinder, composite tube, hollow sphere, etc.

Radiation: Mechanism of energy transport in thermal radiation, laws of radiation: Planck's law, Wien's displacement law, StefanBoltzmann law, Intensity of radiation, Irradiation vs. radiosity, Diffuse vs. specular surfaces, absorptivity, reflectivity, transmissivity, black body radiation, grey body, Kirchhoff's law, view factor, radiation in presence of participating medium, solid angle, radiation in infinite parallel planes with and without participating medium, Radiation exchange among gray diffuse surfaces, Two surface network, three surface network,Derivation of radiation transport equations (RTE), Radiative equilibrium, Divergence of radiative heat flux.

References:

1. F. P. Incropera & D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Willey & Sons
2. M. N. Ozisik, "Heat Transfer-A Basic Approach", McGraw Hill
3. M. F. Modest, "Radiative Heat Transfer", Academic Press

ME 701- Measurement Systems in Mechanical Engineering [50 Marks]

Analysis of Experimental Data

Measurements error and uncertainty analysis, design of experiments, order of instruments and calibration, performance characteristics, frequency response.

Sensors and Transducers

Data sampling, signal conditioning and computer data acquisition. error response characteristic of sensors, measurement error.

Measurement of Process Variables

Pressure Measurement: Dynamic response, dead weight pressure tester, Bourdon gauge; low pressure measurement techniques-the McLeod gauge, Pirani thermal conductivity gauge, Knudsen gauge.

Flow Measurement: Positive displacement methods, flow obstruction methods, the sonic nozzle, hot wire and hot film anemometer, magnetic flow meter, flow visualization method, LDA.

Temperature Measurement: Temperature scales, the ideal gas thermometer, temperature measurement by mechanical effect, electrical effect, radiation, effect of heat transfer on radiation, transient response of thermal systems, thermocouples, temperature measurement in high-speed flow.

References

1. J. P. Holman, "Experimental methods for Engineers", McGraw-Hill.
2. R. S. Sirohi and H. C. Radha Krishna, "Mechanical Measurements", Wiley.

Syllabi for: Debabrata Roy (P24ME003)

ME502 - Convective Heat Transfer and Mass Transfer [50 Marks]

Introduction to Convection
Derivation of governing equations of momentum, energy and species transport, Order of magnitude analysis, Reynolds analogy.

Convective Heat Transfer in External and Internal Flows
Derivation of hydrodynamic and thermal boundary layer equations, Similarity solution techniques, Momentum and energy integral methods and their applications in flow over flat plates with low and high Prandtl number approximations. Introduction to turbulence, Reynolds averaging, Eddy viscosity and eddy thermal diffusivity. Concept of developing and fully developed flows.

Thermally Developing Flows
Graetz problem, Concept of thermally fully developed flow and its consequences under constant wall flux and constant wall temperature conditions, Steady forced convection in Hagen Poiseuille flow, Plane Poiseuille flow, and Couette flow and analytical evaluation of Nusselt numbers in limiting cases.

Free Convection
Free convection boundary layer equations: order of magnitude analysis, similarity solutions.

References:

1. F. P. Incropera & D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Willey & Sons.
2. A. Bejan,"Convective Heat Transfer", John Wiley and Sons.
3. Y. Cengel& A. Ghajar, "Heat and Mass Transfer", McGraw Hill (India) Pvt. Ltd

ME514 - Advanced Fluid Machines [50 Marks]

Fundamental Principles of Fluid Machines:
Classification of fluid machines, rotodynamic machines, basic equation of energy transfer in rotodynamic machines, principle of similarity and dimensional analysis in rotodynamic machines.
Axial Flow Machines:
Axial Flow turbines, pumps, compressors and fans, axial water turbines, forces on blades and their effect on design.
Radial and mixed flow machines:
Radial flow water turbines, radial in-flow gas turbines (nozzle system, rotor geometry), radial outflow turbine.
Centrifugal machines:
Inlet/intake system, impeller design, outlet systems (vaneless diffuser, volute/spiral casing, vaned diffuser systems), thrust loads due to hydrodynamic effects (radial thrust forces, axial thrust loads).
Reciprocating Pumps:
Classification, components, working principle, indicator diagram, effect of acceleration, effect of air vessel, multiple cylinder pumps.
Cavitation and other related issues:
Effects of cavitation on machines (surface damage and erosion effects, hydrodynamic effects, thermodynamic effect on pump cavitation), problems associated with special pumping applications (gas suspension problems, pumping viscous fluids).

References:

1. J. Lal, "Hydraulic Machines including Fluidics", Metropolitan Book, 1994 A. Bejan,"Convective Heat Transfer", John Wiley and Sons
2. Som, Biswas and Chakraborty, "Introduction to Fluid Mechanics and Fluid Machines", TMH, 3rd Edition, 2011
3. R.K. Turton, "Principles of Turbomachinery", Springer 2nd Edition, 1994

Syllabi for: N Smruti Chhanda (P22ME018)

ME511 - Conduction and Radiation [50 Marks]

Introduction: Basic modes of heat transfer, heat transfer mechanisms and the governing laws.
Steady-state Conduction: One Dimensional Problems Fourier's law of heat conduction in Cartesian, cylindrical and spherical coordinates, heat conduction equations in isotropic and anisotropic materials: in Cartesian, cylindrical and spherical coordinate system, Initial and boundary conditions, 1-D conduction problems without and with heat generation: plane wall, hollow cylinder, composite tube, hollow sphere, etc.
Steady-state Conduction: Two and Three Dimensional Problems Steady 2-D problem in Cartesian, analytical methods, problems in cylindrical and spherical coordinate system, steady 3-D conduction in Cartesian coordinate, graphical methods and conduction shape factor., Method of superposition, Stationary and moving heat sources and sinks, Moving boundary problems, Duhamel's theorem.
Unsteady-State Conduction: One dimensional transient problems, solution methods, Lumped system analysis, Semi-infinite media, Laplace transform, Duhamel's theorem, example problems.
Radiation: Mechanism of energy transport in thermal radiation, laws of radiation: Planck's law, Wien's displacement law, StefanBoltzmann law, Intensity of radiation, Irradiation vs. radiosity, Diffuse vs. specular surfaces, absorptivity, reflectivity, transmissivity, black body radiation, grey body, Kirchhoff's law, view factor, radiation in presence of participating medium, solid angle, radiation in infinite parallel planes with and without participating medium, Radiation exchange among gray diffuse surfaces, Two surface network, three surface network,Derivation of radiation transport equations (RTE), Radiative equilibrium, Divergence of radiative heat flux.

References:

1. F. P. Incropera & D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Willey & Sons
2. M. N. Ozisik, "Heat Transfer-A Basic Approach", McGraw Hill
3. M. F. Modest, "Radiative Heat Transfer", Academic Press

ME 701- Measurement Systems in Mechanical Engineering [50 Marks]

Analysis of Experimental Data
Measurements error and uncertainty analysis, design of experiments, order of instruments and calibration, performance characteristics, frequency response.

Sensors and Transducers
Data sampling, signal conditioning and computer data acquisition. error response characteristic of sensors, measurement error.

Measurement of Process Variables
Pressure Measurement: Dynamic response, dead weight pressure tester, Bourdon gauge; low pressure measurement techniques-the McLeod gauge, Pirani thermal conductivity gauge, Knudsen gauge.

Flow Measurement: Positive displacement methods, flow obstruction methods, the sonic nozzle, hot wire and hot film anemometer, magnetic flow meter, flow visualization method, LDA.

Temperature Measurement: Temperature scales, the ideal gas thermometer, temperature measurement by mechanical effect, electrical effect, radiation, effect of heat transfer on radiation, transient response of thermal systems, thermocouples, temperature measurement in high-speed flow.

References

1. J. P. Holman, "Experimental methods for Engineers", McGraw-Hill.
2. R. S. Sirohi and H. C. Radha Krishna, "Mechanical Measurements", Wiley.

2) Research/Specialization Group: 2

(Name of the Group): Core Area (Operations and Supply Chain Management)

Syllabi for: Anindita Mahapatra (P24ME002)

ME 516: Operations Management [50 Marks]

Operations Management and Capacity Planning:

Overview of Operations Management and Capacity Planning: Operations in Manufacturing and Services, Responsibility of Operations Manager, Operations Strategy and Competitiveness, Process Analysis, Job Design and Work Measurement; Capacity Planning – Concept, Types of Capacity; Aggregate Planning - Relevant Cost and Strategies.

Facility Location and Layout

Facility Location and Layout, Inventory Management: Facility Location - Factors, Techniques (Single Facility and Multi-Facility), Factor Rating Method, Centroid Method; Facility Layout – Concept, Types of layout and Line Balancing, Inventory Management – Concept, EOQ, MRP.

Text Books and References

1. R.Panneerselvam, "Production and Operations Management", PHI, 3rd edition,2012.
2. R.B.Chase,F.R.Jacobs,N.J.Aquilano & N.K.Agarwal "Operations Managementfor Competitive Advantage" TMH, 11th edition, 2006.
3. K. Aswathappa and K. S.Bhat, "Production and Operations Management", HPH,2nd edition, 2015.

ME 518: Supply Chain Management [50 Marks]

Scope of Supply Chain Management

Concept of Supply Chain, Integrated Supply Chain, Growth of Supply Chain, Strategic Decision in Supply Chain. Scope of Supply Chain Management: Supply Chain Management as a Management Philosophy, Function of SCM, and Why Supply Chain Management, Value Chain for Supply Chain Management, the Role of IT in Supply Chain. Supply Chain Information System Design Planning, Capacity, Performance Requirement, ManufacturingRequirement, Operation, Transportation, and Inventory Development.

Decision Support Systems

Decision Support Systems for SCM: Introduction, DSS, Components, Types, Processing Information, Specific Types of DSS, Information Technology (IT) Support System for Effective Supply Chain Decision Making.

Text Books and References

1. M. Christopher, "Logistics and Supply Chain Management: Creating Value-AddingNetworks", FT Prentice Hall, 3rd Edition, 2005.
2. R.B.Chase, F.R.Jacobs, N.J.Aquilano & N.K.Agarwal, "Operations Managementfor Competitive Advantage", TMH 11th Edition, 2006.

Signatures and Names of DRC Members:

1. 19/7/24 (Dr. Sumi)
2. 19/07/24 (Dr. B. K. Sarkar)
3. 19/07/24 (Cs. Maily)
4. 19/7/24 (Dr. S. Debbarma)
5.
6.

Signature of DRC Chairman
Date: 19/07/24

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: Physics

1) Research/Specialization Group: 1

(Name of the Group) Energy Harvesting and Devices

Course Code & Course Name: PH 701 Characterization Techniques and Non-equilibrium Thermodynamics, PH 542 Science and Technology of Thin Film, PH 409: Basic Analog and Digital Electronics

Syllabus Content:

Unit 1: X-ray Diffraction, X-ray fluorescence, X-ray photoelectron spectroscopy UV-Visible- IR spectroscopy, FTIR spectroscopy, Raman spectroscopy, Photoluminescence spectroscopy, Scanning Electron Microscopy, Tunnelling Electron Microscopy, Atomic Force Microscopy, Impedance spectroscopy, Electronic (resistivity, Hall effect), Thermal (DTA, TGA, DSC). [25%]

Unit 2: Kinetic theory of gases, effusion, Hertz Knudsen equation; mass evaporation rate; Knudsen cell, directional distribution of evaporating species, evaporation of elements, compounds, alloys, Raoult's law. Physical Vapor Deposition Thermal, e-beam, pulsed laser and ion beam evaporation, glow discharge and plasma, sputtering - mechanisms and yield, dc and rf sputtering, bias sputtering, magnetically enhanced sputtering systems, reactive sputtering. [25%]

Unit 3: Thevenin, Norton theorems and network analysis, AC and DC bridges, rectifier circuits, transistors at low and high frequencies. Diodes, breakdown in diodes, zener diodes, tunnel diodes, Gunn diode, light-emitting diodes, photo-diodes, transistors characteristics, BJT, JFET, MOSFET, integrated circuit fabrication, single stage amplifiers, multistage amplifiers, feedback theory. Operational Amplifier and Digital Electronics. [50%]

2) Research/Specialization Group: 2

(Name of the Group) Smart Materials

Course Code & Course Name: PH 701: CHARACTERIZATION TECHNIQUES AND NON-EQUILIBRIUM THERMODYNAMICS

Syllabus Content:

Vacuum Techniques Kinetic Theory of Gases: Behaviour of gases, pressure of gases, Maxwell's law, gas transport phenomenon; viscous, molecular and transition flow regimes. Vacuum Generation: Measurement of pressure, residual gas analyses; production of vacuum - mechanical pumps, rotary vane pumps, diffusion pump, cryopumps, turbo-molecular pumps, getter and ion pumps, choice of pumping process. Vacuum Measurement: Fundamentals of low-pressure measurement, vacuum gauges McLeod gauge, pirani gauge, penning gauge, thermal conductivity gauges - cold cathode and hot cathode ionisation gauges, materials in vacuum; high vacuum, and ultra high vacuum systems, leak detection. Cryogenics Properties of engineering materials at low temperature, cryogenic fluids and their physical properties, super-fluidity, refrigeration; pomeranchuk cooling, thermoelectric coolers, closed cycle refrigeration, single and double cycle He3 refrigerator, He4 refrigerator, cryostat design; cryogenic level sensors, handling of cryogenic liquids; cryogenic fluid storage, insulations, cryogenic fluid transfer systems, cryogenic thermometry. Characterization Techniques X-ray Diffraction, X-ray fluorescence, X-ray photoelectron spectroscopy UV-Visible- IR spectroscopy, FTIR spectroscopy, Raman spectroscopy, Photoluminescence spectroscopy, Scanning Electron Microscopy, Tunneling Electron Microscopy,

22/07/24 22/7/24 22.07.24

Atomic Force Microscopy, Impedance spectroscopy, Electronic (resistivity, Hall effect), Thermal (DTA, TGA, DSC).

Signatures and Names of DRC Members:

1. _____ 4. _____
2. _____ 5. _____
3. _____ 6. _____

Signature of DRC Chairman
Date 22/07/24

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: Chemical and Biological Sciences

1) Research/Specialization Group: 1

(Name of the Group): Theoretical and Biophysical Chemistry

Course Code & Course Name: CH 701 [Analytical Methods in Chemistry] (Marks 40)

Optical Methods: Atomic absorption spectroscopy, steady state and time resolved fluorescence spectrometry, linear and circular dichroism, X-ray methods: X-ray absorption and X-ray diffraction, photoelectron spectroscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Raman spectroscopy.

Course Code & Course Name: HS 711 (Marks 30)

Syllabus Content

Fundamentals of Research: Meaning and Concepts of Research; Characteristics and Objectives of Research; Criteria of Good Research; Languages of Research; Types of Research; Psychological Tips; Motivation in Research; The Scholar and the Mentor; Institute Rules and Guidelines
The Research Process: Review of Literature; Identifying the Research Problem; Research Hypotheses; Sampling and Data Analysis; Interpretation of Results and Claims
Scholarly Writing: Characteristics of Scholarly Writing; Standard Guidelines; Critical Reviews; Research Proposals; Research Reports; Thesis/Dissertations; Research Papers; Impact Factor of Journals; Citation and Acknowledgement; Plagiarism and Self-Plagiarism; Reproducibility and Accountability.

Course Code & Course Name: CY 533 Biochemistry and Medicinal Chemistry (Marks 30)

Peptides: Amino acids, polypeptide and protein structure, biosynthesis of amino acids, ribosome, mechanism of protein synthesis, sequencing of amino acids in polypeptides, introduction to protein folding problems.

Nucleic acids: Classifications, nucleotides structure and their functions, biosynthesis of nucleotides, replication of DNA and RNA transcription.

2) Research/Specialization Group: 2

(Name of the Group): Organic Synthesis and Polymer Chemistry

Course Code & Course Name: CH 701 [Analytical Methods in Chemistry] (Marks 40)

Optical Methods: Atomic absorption spectroscopy, steady state and time resolved fluorescence spectrometry, linear and circular dichroism, X-ray methods: X-ray absorption and X-ray diffraction, photoelectron spectroscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Raman spectroscopy.

Course Code & Course Name: HS 711 (Marks 30)

Syllabus Content

Fundamentals of Research: Meaning and Concepts of Research; Characteristics and Objectives of Research; Criteria of Good Research; Languages of Research; Types of Research; Psychological Tips; Motivation in Research; The Scholar and the Mentor; Institute Rules and Guidelines
The Research Process: Review of Literature; Identifying the Research Problem; Research Hypotheses; Sampling and Data Analysis; Interpretation of Results and Claims
Scholarly Writing: Characteristics of Scholarly Writing; Standard Guidelines; Critical Reviews; Research Proposals; Research Reports; Thesis/Dissertations; Research Papers; Impact Factor of Journals; Citation and Acknowledgement; Plagiarism and Self-Plagiarism; Reproducibility and Accountability.

Course Code & Course Name: CY 501 Advanced Organic Chemistry (Marks 30)

Principles of Retrosynthetic Analysis: Basic principles and terminology of retrosynthesis analysis, synthetic equivalent, important functional group interconversions, reversal of polarity, one group CX and two group C-X disconnections, one and two group C-C disconnections, examples of retrosynthesis analysis.

Organic Synthesis: Organolithium reagents, organomagnesium reagents, organozinc reagents, organoboron, organotin reagents, organocopper reagents, organopalladium catalyzed C-C bond formation reactions.

Olefin metathesis: Mechanism of olefin metathesis, different generation of Grubbs catalysts and other catalysts for olefin metathesis reactions.

Signatures and Names of DRC Members:

1. _____ (Dr. G. K. Dutta) 4. Dr. Timir Karmakar (on leave)
2. _____ Dr. A. Singha Roy 5. _____
3. _____ (Dr. Nabak. Nath) 6. _____

Signature of DRC Chairman
Date 19/7/24

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

Department: Mathematics

1) Research/Specialization Group: 1

(Name of the Group) Pure Mathematics

Course Code & Course Name: MA402: Complex Analysis

Syllabus Content: Algebra of complex numbers, operations of absolute value and conjugate, extended complex plane, stereo graphic projection; Functions: limit, continuity, derivative, analytic functions, the exponential and logarithmic functions, branch of multi-valued function, branch-cut, trigonometric functions of a complex variable, conformal mapping, bilinear transformations.; Complex Integration: line integrals, rectifiable curves, Cauchy theorem, index of a closed curve, Cauchy's integral formulae, Cauchy's inequality, Liouville's theorem, Morera's theorem, Taylor series expansion; Singularities: Laurent series expansions, Removable singularities, Poles and essential singularities, zeros of analytic functions, Rouche's theorem, Identity theorem, Maximum modulus theorem, open mapping theorem, Schwartz's lemma, Cauchy's residue theorem; Evaluation of real integrals using Cauchy's residue theorem

Course Code & Course Name: MA403: Linear Algebra

Syllabus Content: Vector spaces, subspaces, linear independence and dependence, bases, dimension, coordinates, row-echelon form, reduced row-echelon form. Linear transformations, kernel and range of a linear transformation, rank- nullity theorem, algebra of linear transformations, isomorphism, representation of transformations by matrices, linear functionals, dual and double dual of a space, annihilator of a subset, transpose of a linear transformation. Eigenvalues and eigenvectors, characteristic polynomial, diagonalization of matrices and linear transformation, annihilating polynomials, Cayley- Hamilton theorem, minimal polynomial, invariant subspaces, invariant direct sums, Jordan canonical form

Course Code & Course Name: MA409: Numerical Analysis

Syllabus Content: Gaussian elimination, pivoting strategies, vector and matrix norms, error estimates and condition number; iterative techniques for linear systems: Jacobi, Gauss Seidel; Bisection method, fixed point iteration schemes, Newton's method, secant method; Polynomial interpolation-Lagrange and Newton's divided difference; piecewise interpolation; Newton-Cotes quadrature formulas, composite Newton-Cotes quadrature formulas, Gaussian quadrature formulas

Course Code & Course Name: MA503: Functional Analysis

Syllabus Content: Normed linear spaces, Riesz lemma, Banach spaces; Bounded linear maps on normed linear spaces; Hahn-Banach theorems, uniform boundedness principle, Convergence of sequence of operators, closed graph theorem, open mapping theorem; Dual spaces; Weak and weak* convergence; Inner product spaces, orthonormal set, Gram-Schmidt orthonormalization, Bessel's inequality, orthonormal basis, separable Hilbert spaces. Orthonormal complements, orthogonal projections, projection theorem, Riesz representation theorem-dual of a Hilbert space, adjoint of operators, self-adjoint, normal and unitary operators.

Course Code & Course Name: MA701: Advanced Engineering Mathematics

Syllabus Content: Vector Space over C, linear independence and basis, linear Transform and matrices, eigenvalues, orthogonality; Linear systems of algebraic equations, Gauss elimination, LU factorization, Pivoting. Numerical solution of ODEs: Basic Principles of Numerical Approximation of ODEs, Euler, improved Euler, Runge-Kutta method; Solution of stiff equations; Linear Multistep Methods, Accuracy, Stability; Difference Methods for BVPs, accuracy; Linear Two-Point BVPs; Nonlinear Two-Point BVPs; The Shooting Method for BVPs. Solution of PDEs: finite difference method; Probability, Bayes Theorem, random variables, moment generating function, expectation and its properties, Markov's inequality, Chebyshev's inequality, geometric and binomial distributions

Course Code & Course Name: MA702: Analysis

Syllabus Content: Norms and metrics: Metric spaces, convergence of sequences, completeness, connectedness and sequential compactness; Continuity and uniform continuity; sequences and series of functions, uniform convergence, equicontinuity, Ascoli's theorem, Weierstrass approximation theorem, Calculus of functions of several real variables: Partial and directional derivatives, differentiability, Chain Rule, Taylor's theorem, Maxima and Minima, Lagrange multipliers, Inverse function theorem, Implicit function theorem, Fubini's Theorem, Line integrals, Surface integrals, Green, Gauss and Stokes theorems

Signatures and Names of DRC Members:

1. MANIDEEPA SAHA 22/07/24
2.
3.
4.
5. 22/07/24
6. [SENTHILKUMAR]

22/07/24

Signature of DRC Chairman

Date

Syllabi for Comprehensive Examination of Eligible Ph. D Scholars

(Only for the Courses relating to Research Domains for both Full Time & Sponsored Part Time)

Department: HS – Department of Humanities and Social Sciences

1) Research/Specialization Group: 1

(Name of the Group): Group 1 (All Areas of Humanities and Social Sciences)

Course Code & Course Name: HS701 – Interdisciplinarity in Humanities and Social Sciences

Syllabus Content:

What is Interdisciplinarity? Nature and Scope of Interdisciplinarity, Nature and Scope of the Humanities; Nature and Scope of the Social Sciences; Interdisciplinary Nature of the Humanities and the Social Sciences; Terms and Themes of Interdisciplinarity: Class, Ethics, Eurocentrism, Culture, Cyberculture, Gender, Identity, Representation, Ideology, Knowledge, Discourse, Language, Ontology, Paradigms, Power, Globalisation, Ethnicity, Race, Nation, Social Justice, etc.

Course Code & Course Name: HS503 – Critical Literary Theories

Syllabus Content:

Intellectual Background; Importance of Literary Theory; Humanism; Structuralism; Post-structuralism; Postmodernism; Postcolonialism; Psychoanalysis; Feminism; Sexuality; Gender Studies; Queer Theory; Marxism; Stylistics; Narratology; Ecocriticism; Culture Studies; etc.

Course Code & Course Name: HS504 – Approaches to Literary Research

Syllabus Content:

Importance of Approaches; Literary Criticism; Appreciating Literature; Interpreting Literature; Kinds of Approaches: Reader-Based, Text-Based, Context-Based; Interdisciplinary approach; Critical Approaches to Literature: Formalist, Biographical, Historical, Psychological, Mythological and Archetypal, Sociological, Gender, Reader-Response, Deconstructionist, Cultural Studies

Signatures and Names of DRC Members:

1. _____ 23/07/24
(Dr. S. Maity)

2. _____
(Dr. M.L. Pattar)

Signature of DRC Chairman

Date: 23.07.2024