

EVE - 616 ENVIRONMENTAL PLANNING AND MANAGEMENT

Introduction: environmental and sustainable development, concept of carrying capacity, relation among quality of life, carrying capacity and resource utilization.

Engineering Methodology in Planning and its Limitations: carrying capacity based short and long term regional planning.

Environmental Protection: economic development and social welfare consideration in socio-economic developmental policies and planning. Total cost of development and environmental protection cost. Case studies on regional carrying capacity planning.

Engineering Economics: value engineering, time value of money, cash flows, budgeting and accounting. Cleaner Technologies:

introduction and their role in environmental protection.

Environmental Quality Management: total quality management (TQM) and ISO 14000 Series of Standards. Introduction and importance of environmental audit in environmental management.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Planning and Design of Engineering Systems by Danoy and Warner, Unwin Hyman Publications.
- ISO 14000 Environmental Management by Goetsch and Staley, Prentice Hall NJ.
- Environmental Protection by Chanlett, McGraw Hill Publication, USA.
- Environmental Quality Management by B.N. Lohani, South Asian Publications.
- Environmental Health and Safety Auditing Handbook by Lee Harrison, McGraw Hill Inc., USA.



EVE - 617 BIOREMEDIATION: PRINCIPLES AND APPLICATIONS

Introduction: bioremediation, current bioremediation practices and applications.

Microbial Systems of Bioremediation: factors influencing bioremediation (environmental, physical and chemical factors), genetic responses of microorganisms to the prEVence of pollutants.

Application of genetically engineered microorganisms for hazardous waste management, microbial transformation reactions (aerobic and anaerobic biotransformations), microbial detoxification of specialty chemicals (insecticides, herbicides, fungicides, polychlorinated biphenyls, heavy metals).

Bioremediation systems and processes (solid, liquid and slurry phase bioremediation), microbial cleaning of gases (bio-filtration and bio-scrubbing).

In-situ bioremediation, laboratory scale bio-treatability studies for bioremediation, management of bioremediation projects.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Bioremediation: Innovative Site Remediation Technology by W.D. Anderson, American Academy of Environmental Engineers.
- Bioremediation: Principles and Practice by Sikdar and Irwin, Technomic Publications, Lancaster, PA, USA.



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EVE -618 ENVIRONMENTAL ENGINEERING LAB - I

List of Experiments:

1. To determine the pH of a given sample of water.
2. To determine the various forms of alkalinity and acidity in water sample.
3. To determine the chloride content in a given water sample.
4. To determine temporary and permanent hardness in a given sample of water.
5. To determine total, dissolved, suspended and volatile residues in water sample.
6. To determine the dose of coagulant required for optimum coagulation.
7. To determine the dissolved oxygen (DO) in a given sample of water.
8. To determine the sulphate concentration in a given sample of water.
9. To determine the coliform bacteria by total count method in a given sample of water.
10. To determine the most probable number of coliform bacteria in a given water sample by British technique.

Recommended Books and Codes:

- Standard Methods for the Examination of Water and Wastewater APHA Washington DC.
- Chemistry for Environmental Engineering by C.N. Sawyer and P.L. McCarty, McGraw-Hill Book Agency.
- IS: 3025 Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater.
- IS: 2720 Method of Test for Soils



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EVE -621 SOLID AND HAZARDOUS WASTE MANAGEMENT

Introduction: definitions, generation of solid waste, sources, classification, quantity, composition and characteristics of solid waste. Solid waste collection, transportation, processing, recovery and disposal.

Disposal: recovery of material, selection of site, land disposal, disposal in water bodies, feeding to hogs. Sanitary Land Filling: definition, methodology, leachate treatment, gas collection and recirculation.

Composting: aerobic and anaerobic composting, vermi-composting.

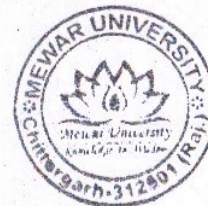
Incineration: 3Ts to control high temperature in incinerators, design approach, prevention of air pollution. Pyrolysis: process, basic steps involved, end product, pyrolysis of specific solid waste.

Solid Waste Management: 3Rs of solid waste management, material and energy recovery operations. Hazardous wastes: introduction, types, health effects, treatment methods, management and disposal.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Environmental Engineering by H.S. Peavy, D.R. Rowe & G.Tchobanoglous, McGraw Hill Inc. New York.
- Environmental Engineering by A.P. Sincero and G.A. Sincero, PHI, N. Delhi.
- Solid Waste: Engineering, Principles and Management Issues by Tchobanoglous, Theisen and Eliassen, McGraw Hill, New York.
- Waste Management: Planning, Evaluation and Technologies by D.C. Wilson, Oxford Press, London.
- Hazardous Waste Management by Michael D. La Grega, Phillip L. Buckingham, Jeffery Evans.
- Environmental Science and Engineering by J.G. Henry & G.W. Heinke



EVE -622 INDUSTRIAL WASTE MANAGEMENT

Industrial wastes: characteristics and composition of different industrial effluents, effects of disposal of industrial effluents, prevention versus control of industrial pollution, linkage between technology and pollution prevention, standards for disposal of industrial effluents.

Strategies of industrial waste management: good housekeeping, equalization, neutralization, chemical precipitation, etc. Water and energy use in industry.

Treatment strategies for industrial effluents: Mixing different effluent streams partially or fully, treatment of combined effluent. Treatment of specific characteristics of industrial effluents.

Process flow chart, effluent generation, composition and treatment of effluents from following industries - sugar, pulp and paper, distilleries, electroplating, dairy, oil refineries, steel, etc.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Industrial Wastewater Treatment by M.N. Rao and A.K. Dutta, Oxford and IBH publishing company, New Delhi
- Water Recycling & Pollution Control Handbook, A.V. Bridge water, C.J. Mumford, Van Nostrand Reinhold Company New York.
- Pollution Control in Process Industries, S.P. Mahajan, Tata McGraw Hill Publishing Co. Ltd, NewDelhi.
- Industrial Wastewater Management Handbook, Hardom Singh Azad, McGraw Hill Book Co., New York.
- Principle of Industrial Waste Treatment, C. Fred Gurnham, John Wiley & Sons Inc, New York.
- Industrial Pollution Control Handbook, Herbert F. Lund, McGraw



EVE -623 ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment: concept, rationale/purpose, benefits, stages of environmental impact analysis.

Measurement of environmental impacts: physical environmental, social, economic and other variables. Environmental indices and impact assessment methods.

Identification, assessment, impact assessment methodologies and mitigation of fundamental impacts like - air, noise, water, soil & geological, biotic, socio-economic and aesthetic environmental impacts.

Economic approaches to environmental impact assessment: economic activities and environment, social benefit cost approach, input-output approach, econometric approach and programming approaches.

Case Studies: EIA of various development activities, projects like hydro or river valley, thermal, oil refineries, highway, etc.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Environmental Impact Assessment by L.W. Canter, McGraw Hill Inc. New York.
- Environmental Impact Analysis by Jain, Urban and Stacey, Van Nostrand and Reinhold Co. NY.
- Environmental Impact Assessment by R.R. Barthwal, New Age Int., N. Delhi.
- Environmental Impact Analysis Handbook by Rau and Wooten, McGraw Hill Inc. New York.



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EVE -624 LIFE CYCLE ANALYSIS AND DESIGN FOR ENVIRONMENT

Engineering Products and Processes- environmental health and safety, product life cycle stages, material toxicity, pollution and degradation, environmentally conscious design and manufacturing approaches, sustainable development and industrial ecology. System life cycles from cradle to re-incarnation, product life extension, organizational issues. Pollution prevention practices, manufacturing process selection and trade-offs.

Design for Environment: motivation, concerns, definitions, examples, guidelines, methods and tools. Recyclability assessment, design for recycling practices. Re-manufacturability assessments, design for re-manufacture / reuse practices.

Industrial ecology and eco-industrial parks, eco-labels and life-cycle analysis (LCA), LCA methodology, steps, tools and problems. Life-cycle accounting and costing.

ISO 14000 Environmental Management Standards, new business paradigms and associated design practices.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Environmental Health and Safety Auditing Handbook by Lee Harrison, McGraw Hill Inc., USA.
- ISO 14000 Environmental Management by Goetsch and Staley, Prentice Hall NJ.
- Environmental Engineering by H.S. Peavy, D.R. Rowe & G.Tchobanoglous, McGraw Hill Inc. New York.



EVE -625- INDUSTRIAL SAFETY AND ENVIRONMENT

Introduction: quality parameters and classification of natural water, physico-chemical and biological water quality classification of aquatic systems, sources of pollution, characteristics of point and non-point sources of pollution.

Eutrophication in natural water bodies: causes, processes and control. Toxic Wastes: sources, transport and management strategies.

Thermal Pollution: causes model and control.

Acid Rains: occurrence, impacts and strategies to control.

Water Quality Monitoring: objectives, requirements, planning and various techniques.

Case Studies related to water quality monitoring under various river action plans including Ganga and Yamuna Action Plans.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Water Quality: Characteristics, Modeling and Modifications by Tchobanoglous and Schroeder, Addison-Wesley Pub. Co. USA.
- Principles of Surface Water Quality Modeling and Control by Thomann and Mullar, Harper and Row Pub. NY.
- Standard Methods for the Examination of Water and Wastewater APHA Washington DC.
- Engineering Approaches for Lake Management (Vol. I) by Reckhow and Chapra, Butterworth Pub. Boston.
- Applied Stream Sanitation by C.J. Velz, Wiley Interscience NY.
- Biology and Water Pollution Control by C.E. Warren, Saunders Publications Philedephia.



EVE -626- ADVANCED COMPUTATIONAL METHODS AND OPTIMIZATION

Numerical Methods: Newton Raphson method for solution of simultaneous equations, numerical solutions of partial differential equations, finite difference methods, finite element method and method of characteristics. Explicit and implicit methods to solve simple parabolic differential equations, convergence, boundary value problems and successive over relaxation methods. Numerical dispersion errors and their prevention, comparison of solutions by analytical and finite difference techniques for one dimensional instantaneous discharge, simple computer program based examples.

Optimization: definition and classification of optimization problems, importance in environmental studies, single and multivariable optimization without and with constraints.

Linear Programming: standard form of problems, pivotal reduction of equations, single and two phase simplex methods, piece wise linear approximation of non-linear optimization.

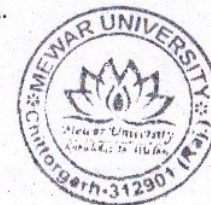
Numerical Search Methods for 1-D Non-linear Problems: Dichotomous, Fibonacci and Golden section methods, quadratic and cubic interpolation methods, solutions of linear programming problems using computer programming.

Statistics and Probability: frequency distribution, central tendency and dispersion, concepts of probability, Binomial, Poisson and normal distribution and their applications, method of least square and regression, multiple regression, Chi-squared test, F- test, t-test. Analysis of problems using computer programming.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Numerical Methods for Engineers by Chapra and Canale, Tata McGraw Hill N. Delhi.
- Introduction to Finite Element Method by Desai and Abel, Affiliated East West Press N. Delhi.
- The Finite Element Method by O.C. Zienkiewicz, Tata McGraw Hill N. Delhi.
- Handbook of Statistical Methods for Engineers and Scientists by H.M. Wodsworth, McGraw Hill Inc. USA.



EVE -627- ENVIRONMENTAL ISSUES, PROTECTION AND LAWS

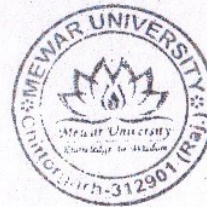
Environmental Issues: climate change, global warming, stratospheric ozone depletion, acid rains, etc., scientific evidence for climate change, international response. International Protocols and Conventions pertaining to ozone layer, climate, bio- diversity, oceans, etc. Globalization, sustainability and climate change. Environment Policy of Govt. of India.

Environmental Legislation and Laws in India: Laws and acts relating to water pollution, air pollution, industrial pollution, forest, solid waste disposal, etc. Enforcement machinery, environmental issues and judicial trend, corporate environmental liability.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Climate Change: From Science to Sustainability by S. Peake and J. Smith, Oxford University Press.
- Environmental Law by D.S. Senegar, Prentice Hall of India N. Delhi.
- Law and Environment by Leela Krishan, P Eastern Book Co.
- Environment Disasters and the Law by Vinod Shankar Mishra, Ashish Publications.
- A Basic Course in Environmental Studies by S. Deswal and A. Deswal, Dhanpat Rai & Co. (P) Ltd., N. Delhi.



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EVE -628 ENVIRONMENTAL ENGINEERING LAB - II

List of Experiments:

1. To determine the pH of a given sample of sewage / soil.
2. To determine the various forms of alkalinity and acidity in sewage sample.
3. To determine total, dissolved, suspended and volatile residues in sewage sample.
4. To determine the chemical oxygen demand (COD) of a given sewage sample.
5. To determine the biochemical oxygen demand (BOD) of a given sewage sample.
6. To determine the sulphate concentration in a given sample of soil.
7. Determination of concentration of suspended particulate matter in air.
8. Measurement of nitrogen oxide (as NO_2) / sulphur dioxide / carbon monoxide concentration in air.
9. Determination of gaseous pollutants from vehicles fitted with internal combustion engines.
10. Measurement of noise in residential, industrial and traffic areas.

Recommended Books and Codes:

- Standard Methods for the Examination of Water and Wastewater APHA Washington DC.
- Chemistry for Environmental Engineering by C.N. Sawyer and P.L. McCarty, McGraw-Hill Book Agency.
- IS: 3025 Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater.
- IS: 2720 Method of Test for Soils
- IS 5182 Methods for Measurement of Air Pollution
- IS 14600 Automotive Vehicles-Exhaust Emissions-Gaseous Pollutants from Vehicles Equipped with ICE
- IS 9989 Assessment of Noise with respect to Community Response



EVE -631 RENEWABLE ENERGY SOURCES

Introduction: Fundamental concepts of energy, forms of energy, energy sources - conventional and non-conventional, renewable and non-renewable.

Renewable Energy Sources: Advantages, disadvantages, potential, utilization, application / usage, economics and environmental impacts of renewable energy sources (solar, wind, bio, hydro, tidal, wave, geothermal) with special emphasis on Indian scenario.

Integration of energy sources and promotions of renewables.

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

Recommended Books:

- Renewable Energy: Power for a Sustainable Future by G. Boyle, Oxford University Press.
- Renewable Energy Sources and their Environmental Impact by S.A. Abbasi and N. Abbasi, Prentice Hall of India N. Delhi.
- A Basic Course in Environmental Studies by S. Deswal and A. Deswal, Dhanpat Rai & Co. (P) Ltd., N. Delhi.



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EVE -632 APPLICATION OF REMOTE SENSING IN ENVIRONMENTAL ENGG

Introduction: Introduction to Remote Sensing – Usefulness in Environmental Engineering

Fundamental of Remote Sensing and Electro Magnetic Radiation (EMR): Definition – Components of Remote Sensing – Principles of Remote Sensing Energy Sources – Active and Passive Remote Sensing – Electro Magnetic Radiation (EMR) and the Electromagnetic Spectrum – Interaction of EMR With the Earth's Surface – Interactions with the Atmosphere

Image Interpretation and Digital Image Processing: Interpretation Procedure – Strategies – Keys – Equipments – Digital Image Processing – Rectification and Restoration – Enhancement of Image – Image Transformation, Classification and Analysis

Applications: Application of Remote Sensing in Environmental Engineering – Case studies – Remote Sensing – Management and Monitoring of land, air, water pollution – conservation of resources and coastal zone management

Note: The examiner is required to set EIGHT questions in all carrying equal marks covering the entire syllabus. The candidate is required to attempt FIVE questions.

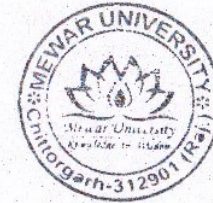
Recommended Books:

- Remote Sensing and image Interpretation by Lilliesand T.M. and Kiefer R.W., John Wiley and Sons, 1994.
- Remote Sensing and Geographical information System by A.M. Chandra and S.K. Ghosh, Narosa Publishing House, New Delhi, 2006
- Remote Sensing and GIS by Bhatta B., Oxford University Press, New Delhi, 2008.
- Remote Sensing – Principles and Applications by .B. C. Panda,. Viva Books Pvt Ltd, 2008.



EVE - 633 SEMINAR

The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of seminar report and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.



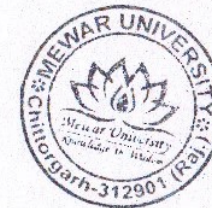
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EVE - 634 MINOR PROJECT

The student is required to deliver a seminar on some emerging topics of concern Engineering. Senior faculty will supervise the students in selecting and preparation of the same. The student will submit one copy of Minor project seminar report spiral binding and shall make oral presentation as per time schedule decided by the faculty concerned. Internal Evaluation will be made on the basis of report, presentation and the discussion during the presentation.



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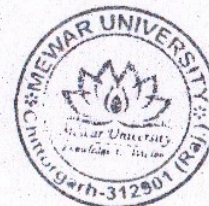
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EVE - 641 DISSERTATION

The primary objective of this course is to enhance the student ability to analyze and carry out independent investigations etc. Each student will carry out independent work which should involve creativity, innovation and ingenuity. A dissertation supervisor (s) having at least post-graduate qualification, having minimum three experience after post graduation and published papers in international journal of repute in his/her credentials OR Doctorate degree with published papers in international journal of repute in his/her credentials, may be from industry/research organization shall be assigned to the student approved by the competent authority. *In no case, the candidate can have more than two dissertation supervisors.* Dissertation work shall comprise of literature survey, problem formulation, methodology used, S/W, H/W tools used, Results and discussion followed by the conclusions & further scope of work in that area. Industry oriented projects may be encouraged for the purpose. Finally, student must have published at least one international paper before submission of dissertation.

The submission of dissertation shall be allowed only after ensuring that the research work carried out by the candidate has attained the level of satisfaction of the Dissertation Supervisor (s) and proof of communication/acceptance of the research paper (if any, and certified in the report) in the relevant refereed journal/conference. The final dissertation external examination in 4th semester shall be taken by a panel of examiners comprising of concerned Supervisor (s), one external examiner (from the relevant field) nominated/approved by the competent authority. Hard copies of dissertation, one for each supervisor (s), examiner and the university/ department, are required to be submitted by the student before the final dissertation external examination. The candidate shall appear before the examining committee for oral examination and presentation on the scheduled date.



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LIST OF ELECTIVES

ELECTIVE - I

1. CTM-615 Tender Contract & specification
2. CTM-616 Maintenance & Rehabilitation of Structures
3. CTM-617 Solid & Hazardous Waste Management
4. CTM-618 Building Science
5. CTM-619 Low Cost Building Material and Construction Techniques

ELECTIVE - III

1. CTM-625 Transportation Economics
2. CTM-626 Principles of affordable Housing
3. CTM-627 Building Services & Maintenance Management
4. CTM-628 Design of Earthquake Resistant Structures



U.S.W.

MEWAR UNIVERSITY
Department of Civil Engineering

MTech: Construction Technology & Management
Low cost building materials and construction techniques

Unit – I: Concepts of low cost materials Soil, Fly ash, Ferro-cement, Lime, Fibers, Stone Dust, Boulders and oversize metal, Bitumen etc.

Unit – I I: Low cost building material products:- (a) Walls - Stabilized and sun dried, soil blocks & bricks, Hollow concrete blocks, stone masonry blocks, Ferro-cement partitions. (b) Roofs - Precast R.C. Plank & Joists roof, precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferro-cement shells, Filler Slab, Seasal Fibre roof, improved country tiles, Thatch roof.

Unit – III: Low cost construction Techniques and Equipment :- (a) Techniques: - Rat trap bond construction, Precast R.C. and Ferro cement technique, Mud Technology. (b) Equipments: - Brick molding machine, Stabilized soil block making machine and plants for the manufacturing of concrete blocks. (c) Low Cost Roads :-

Unit – IV: Low cost Sanitation: - (a) Waste water disposal system (b) Low cost sanitation for rural and urban areas (c) Ferro cement Drains

Unit – V: Cost analysis and Comparison: - (a) Low cost materials (b) Low cost techniques

REFERENCE BOOKS:

1. David K Blythe "Understanding Low Cost Road Building (Technologies for Development)"
2. Gonzalo Lizarralde "The Invisible Houses: Rethinking and designing low-cost housing in developing countries"
3. Steven W Hatch "Practical Yurts: Building and Living in a Low Cost Alternative Structure"
4. Fernando Pages Ruiz "Building An Affordable House: A Smart Guide to High-Value, Low-Cost Construction"

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MEWAR UNIVERSITY
Department of Civil Engineering

MTech: Construction Technology & Management
BUILDING SCIENCE

Unit – I: Climatic factors, Classification of tropical climates, site climate, micro climate of human settlements.

Unit – II: Thermal comfort factors: Thermal indices, thermal quantities, heat exchange in buildings, periodic heat flow, mechanical and structural means of thermal control.

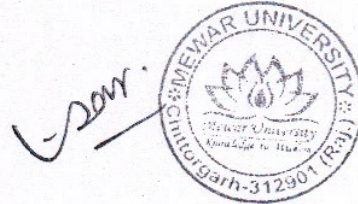
Unit – III: Ventilation: Ventilation requirements for health, mechanisms and estimation of natural ventilation, airflow patterns in building

Unit – IV: Noise control in Buildings: Sound insulation, absorption, transmission reverberation roofing and walling system for sound absorption and insulation, noise and noise control in buildings.

Unit – V: Principles of day lighting in buildings: Day lighting: Lighting principles and fundamentals, Sky, Indian sky, daylight prediction and design of fenestration.

REFERENCE BOOKS:

1. Koenigsberger, O.H. et al, "Manual Of Tropical Housing And Building Part-I Climatic Design", Orient Longman. 1973.
2. B C Punmia, "Building Construction", Laxmi Pub
3. Bureau of Indian Standards, " Hand Book Of Functional Requirements Of Buildings, (Sp-41 & Sp-32)", BIS 1987 and 1989.



MEWAR UNIVERSITY
Department of Civil Engineering

MTech: Construction Technology & Management
DESIGN OF EARTHQUAKE RESISTANT STRUCTURES

Unit – I: Introduction to engineering seismology, characteristics of earthquake and its quantification, seismological instrumentation in buildings, introduction to structural dynamics of buildings, Seismic response of buildings and sites –

Unit – II: Dynamic properties of buildings and sites, building code requirements for earthquake effects, forms of seismic response, structural response, structural failures, nonstructural damage, behaviour of ordinary construction, site failures, building foundation failures.

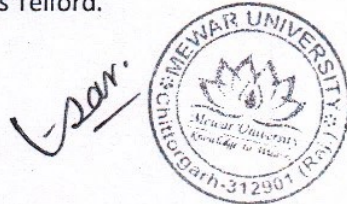
Unit – III: Desirable features of earthquake resistant buildings, damping, ductility and energy absorption in buildings, details of providing ductility in structures, lessons from structural damage during past earthquakes.

Unit – IV: Earthquake analysis of linear systems- Response history analysis and response spectrum analysis. Earthquake analysis of multistoried RC structure, discussion of IS code provisions of Earthquake resistant design of buildings.

Unit – V: Design of basic structural elements (Reinforced concrete) such as beams, columns and slabs subjected to dynamic loads by limit state method. Concepts for Earthquake resistant masonry – IS codal provisions

REFERENCE BOOKS:

1. Minoru Wakabayashi, "Design of Earthquake Resistant Buildings"- McGraw Hill Pub.
2. Anil K Chopra, "Dynamics of Structures – Theory and Application to Earthquake Engineering"- 2nd ed., Pearson Education pub.
3. Anderson, R.A., "Fundamentals of Vibrations"- Mc Millan
4. IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993 35
5. Timoshenko, S., "Vibration and Structural Dynamics"-VanNostrand Co.,
6. Clough and Penzien, "Dynamics of Structures".
7. Mukyopadhyaya, "Vibration and Structural Dynamics"- Oxford & IBH
8. James Ambrose and Dimitry Vergun, "Design for Earthquakes".
9. David Key, "Earthquake Design Practice for Buildings", Thomas Telford.



LIST OF DEPARTMENTAL ELECTIVES (31)

CE-421/422/423/424

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|---|---|
| <ul style="list-style-type: none"> ❖ Quantity Survey and Valuation ❖ Prestressed Concrete Structures ❖ Ground Improvement Techniques ❖ Solid and Hazardous Waste Management ❖ Hydro Power Engineering ❖ Optimization Techniques for Civil Engineering ❖ Bridge Engineering ❖ Highway & Airfield Pavement Design ❖ Sustainable Construction Method ❖ Energy-Efficient Building Design ❖ Geo-synthetics and Reinforced Soil Structures ❖ Building Information and Modeling ❖ Computational Hydraulics ❖ Elements of Earthquake Engineering ❖ Green Buildings ❖ Detailing of RC and Steel Structures | <ul style="list-style-type: none"> ❖ Finite Element Methods ❖ Traffic Engineering ❖ Environmental Pollution Control ❖ Hydraulic Structures ❖ Retrofitting and Rehabilitation of Structures ❖ Machine Foundations ❖ Rock Mechanics ❖ Structural Dynamics and Seismic Design ❖ Probability Methods in Civil Engineering ❖ Structural Health Monitoring (SHM) ❖ Computational Methods in Civil Engineering ❖ Environmental Impact Assessment and Management ❖ Artificial Intelligence in Civil Engineering ❖ Building Technology and Architectural Planning ❖ Numerical Methods in Geotechnical Engineering |
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LIST OF OPEN ELECTIVES (14)

OE-431/432

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|---|--|
| <ul style="list-style-type: none"> ❖ Operations Management ❖ Advanced Engineering Mathematics ❖ Entrepreneurship ❖ Soft Computing ❖ Artificial Intelligence ❖ Remote Sensing & GIS ❖ IT for Smart Cities | <ul style="list-style-type: none"> ❖ Renewable Energy Sources ❖ Consumer Electronics ❖ Security in Computing ❖ Modeling and Simulation ❖ Microprocessors and Microcontrollers ❖ Civil Engineering Estimating & Costing ❖ Material and Human Resource Management |
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B.TECH (7th SEMESTER) CIVIL ENGINEERING**CE-421/422/423/424 NUMERICAL METHODS IN GEOTECHNICAL ENGINEERING**

L	T	P	Cr
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Internal Evaluation: 50
Marks External Examination: 50
Marks Duration of Examination: 03 Hours

Course Objective:

Understand the principles and concepts of numerical methods in geotechnical engineering. Apply numerical techniques to solve geotechnical engineering problems. Develop mathematical models for geotechnical systems and structures. Analyze and design geotechnical systems using numerical methods. Interpret and validate numerical results through comparison with analytical and experimental data. Identify the limitations and sources of error in numerical analyses. Evaluate the stability and performance of geotechnical structures using numerical methods. Use commercial software packages for geotechnical analysis and design.

UNIT - I

Overview of numerical techniques in geotechnical engineering, Advantages and limitations of numerical methods, Role of numerical methods in geotechnical analysis and design, Mathematical Modeling of Geotechnical Systems, Formulation of governing equations for geotechnical problems, Discretization and discretization errors, Boundary conditions and initial conditions.

UNIT - II

Derivation and application of finite difference equations, Solution of transient and steady-state problems, Stability and accuracy considerations, Finite Element Method, Introduction to finite element analysis Discretization of geotechnical problems using finite elements, Solution techniques and element types, Modeling of soil behavior and constitutive models

UNIT - III

Principles and formulation of the boundary element method, Application to geotechnical problems, Comparison with finite element method, Numerical Optimization in Geotechnical Engineering, Introduction to optimization techniques, Application of optimization methods in geotechnical analysis and design, Multi-objective optimization and sensitivity analysis

UNIT - IV

Comparison of numerical results with analytical and experimental data, Assessment of accuracy and reliability, Sensitivity analysis and uncertainty quantification, Commercial Software Packages for Geotechnical Analysis, Overview of commonly used software packages, Hands-on exercises with commercial software, Case Studies and Applications, Analysis and design of geotechnical structures using numerical methods, Real-world applications and examples

References

- "Numerical Methods in Geotechnical Engineering" by Chandrakant S. Desai and J. T. Christian
- "Finite Element and Boundary Methods in Structural Acoustics and Vibration" by Roger Ohayon.

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B.TECH (7th SEMESTER) CIVIL ENGINEERING
CE-421/422/423/424 DETAILING OF RC AND STEEL STRUCTURES

L	T	P	Cr
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Internal Evaluation: 50
Marks External Examination: 50
Marks Duration of Examination: 03 Hours

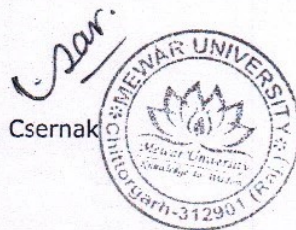
Course Objective:

Understand the principles and concepts of detailing for reinforced concrete (RC) and steel structures. Demonstrate proficiency in creating detailed drawings, plans, and specifications for RC and steel structures. Apply appropriate design codes, standards, and regulations in the detailing process. Develop effective communication skills to collaborate with architects, engineers, and contractors during the detailing process. Apply knowledge of construction materials, methods, and techniques to produce practical and constructible detailing solutions. Understand the role of computer-aided design (CAD) software and other relevant tools in the detailing process. Evaluate and select appropriate reinforcement and steel connections based on structural requirements and design specifications. Apply quality control measures to ensure accuracy, completeness, and compliance of detailing documents.

UNIT - I	Overview of detailing process and its importance in construction projects., Role of detailing in enhancing structural integrity and safety. Understanding the relationship between design drawings, specifications, and detailing. Reinforced Concrete (RC) Detailing, Overview of reinforced concrete structures and their components. Understanding reinforcement detailing requirements for beams, columns, slabs, and foundations. Detailing of reinforcement bars, stirrups, hooks, and other reinforcement elements. Reinforcement placement, spacing, and cover requirements. Detailing considerations for special structural elements such as shear walls, retaining walls, and staircases. Detailing for durability, fire resistance, and seismic considerations.
UNIT - II	Introduction to steel structures and their characteristics. Detailing requirements for steel beams, columns, trusses, and connections. Selection and detailing of appropriate steel connections(welded, bolted). Detailing of steel plates, gussets, and bracing elements. Detailing considerations for special steel structures such as industrial buildings and bridges. Detailing for corrosion protection and fire resistance in steel structures. Codes, Standards, and Regulations: Overview of relevant design codes and standards for RC and steel structures. Understanding the application of codes and regulations in detailing. Compliance with building regulations, safety codes, and environmental requirements.
UNIT - III	Introduction to computer-aided design (CAD) software for detailing. Utilizing CAD tools for creating detailed drawings, plans, and specifications. Use of other software and tools for quantity estimation, reinforcement detailing, and clash detection..
UNIT - IV	Importance of quality control in detailing and construction. Techniques for checking and verifying accuracy and completeness of detailing documents. Coordination with architects, engineers, and contractors during the detailing process. Resolving design conflicts and issues through effective communication and collaboration.

References

- "Design of Steel Structures" by S.K. Duggal:
- Structural Steel Design" by Jack C. McCormac and Stephen F. Csernak



B.TECH (7th SEMESTER) CIVIL ENGINEERING
OE-431/432 IT FOR SMART CITIES

L	T	P	Cr
3	-	-	3

Internal Evaluation: 50
Marks External Examination: 50
Marks Duration of Examination: 03 Hours

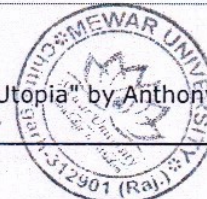
Course Objective:

Understand the concept of smart cities and the role of information technology (IT) in their development. Analyze the challenges and opportunities associated with implementing IT solutions in smart city initiatives. Identify and evaluate the various components and technologies that contribute to the development of smart cities. Apply IT solutions and data analytics techniques to enhance the efficiency and sustainability of urban systems. Design and develop innovative applications and services for smart cities using emerging technologies. Assess the social, economic, and environmental impacts of IT-enabled smart city solutions. Collaborate effectively with multidisciplinary teams to plan, implement, and manage smart city projects. Understand the ethical and privacy considerations associated with the use of IT in smart cities. Communicate and present complex IT concepts and solutions to stakeholders and the wider community.

UNIT - I	Definition and characteristics of smart cities, Evolution and drivers of smart city initiatives, Benefits and challenges of smart cities, Role of IT in smart city development, Urban Infrastructure and Services, Transportation systems and intelligent transportation, Energy management and smart grids, Water supply and waste management, Public safety and emergency response, Internet of Things (IoT) in Smart Cities, IoT technologies and applications in urban environments, Sensors and actuators for data collection and monitoring, Data integration and interoperability in IoT systems, IoT platforms and architectures for smart cities.
UNIT - II	Data management and analysis in urban environments, Data visualization and decision support systems, Predictive modeling and machine learning algorithms, Privacy and security considerations in big data analytics, Intelligent Transportation Systems, Traffic management and congestion control, Intelligent vehicle systems and connected cars, Smart parking and mobility services, Multi-modal transportation integration, Smart Energy Management, Smart grids and energy distribution systems, Energy monitoring and demand response, Renewable energy integration and optimization, Energy efficiency and conservation initiatives.
UNIT - III	Smart water distribution networks, Water quality monitoring and management, Water conservation and leak detection, Integrated water resource management, Smart Buildings and Infrastructure, Building automation systems and controls, Energy-efficient building design and management, Indoor environmental quality and occupant comfort, Smart infrastructure for resilient cities, Civic Engagement and E-Government, E-governance and citizen participation platforms, Open data initiatives and transparency in governance, Digital services for citizens and businesses, Smart city governance models and policies
UNIT - IV	Blockchain applications in urban systems, Artificial intelligence and machine learning in smart cities, Augmented and virtual reality for urban planning, 5G and wireless communication technologies, Smart City Project Management, Project planning and feasibility analysis, Stakeholder engagement and collaboration, Risk assessment and mitigation strategies, Evaluation and performance monitoring of smart city projects, Ethical and Social Considerations in Smart Cities, Privacy and data protection in smart city systems, Equity and inclusivity in smart city development, Ethical considerations of AI and automation in cities, Social and cultural impacts of smart city technologies.

References

- Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia" by Anthony M. Townsend.





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- "The Responsive City: Engaging Communities Through Data-Smart Governance" by StephenGoldsmith and Susan Crawford

B.TECH (7th SEMESTER) CIVIL ENGINEERING
OE-431/432 MATERIAL AND HUMAN RESOURCE MANAGEMENT

L	T	P	Cr
3	-	-	3

Internal Evaluation: 50
 Marks External Examination: 50
 Marks Duration of Examination: 03 Hours

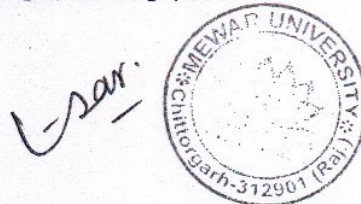
Course Objective:

Understand the fundamental principles and concepts of material and human resource management. Analyze the role and significance of material and human resources in organizational performance. Apply various techniques for demand forecasting, inventory management, and procurement of materials. Develop production planning strategies to optimize resources and minimize costs. Explain the recruitment and selection process and employ appropriate methods for candidate evaluation. Design and implement training and development programs to enhance employee skills and performance. Apply performance appraisal methods to evaluate and provide feedback to employees. Understand the importance of employee motivation and apply motivational theories to improve employee satisfaction and productivity

UNIT - I	Introduction to Material and Human Resource Management: Definition, importance, and scope, Evolution and trends in material and human resource management, Role of material and human resources in organizational performance, Material Resource Management, Demand forecasting and planning, Inventory management techniques, Procurement strategies and supplier selection, Vendor management and negotiation
UNIT - II	Production Planning and Control, Capacity planning and resource allocation, Lean production systems, Quality management, Supply chain management.
UNIT - III	Human Resource Management Recruitment and selection, Training and development, Performance appraisal and feedback, Employee motivation and engagement; Effective communication techniques Negotiation strategies and conflict resolution
UNIT - IV	Legal and Ethical Issues, Employment laws and regulations, Diversity and equal opportunity, Ethical considerations in material and human resource management, Communication and Negotiation Skills

References

- "Construction Management: Subcontractor Scopes of Work" by Jason G. Smith.
- "Construction Management and Planning" by Bockstiegel, Morledge, and Smith



OFFICE OF REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No. MU/RO/2020/457-A

25th March, 2020

OFFICE ORDER

Sub: Reconstitution of Board of Studies for Department of Mechanical Engineering.
The Board of Studies for the Department of Mechanical Engineering is reconstituted as per rule 7 of the Statutes of Mewar University, as under:

SN	Name	Designation	Post
1	Dr. Tanveer Ahmed Kazi	Professor & Dean, Faculty of Engg& Technology	Chairman
2	Mr. Kapil Nahar	Assistant Professor & HOD	HOD-Convener
3	Dr. Rakesh Bandhari	Professor & Dean Research Sangam University, Bhilwara	External Member
4	Mr. Upeesh Jain	Sr. Engineer, Jindal Saw Limited, Bhilwara	Member from Industry
5	Dr. Rahul Lodha	Associate Professor	Internal Member 1
6	Mr. Dinesh Kumar	Assistant Professor	Internal Member 1
7	Mr. Sunil Kumar Katheria	Assistant Professor	Internal Member 2
8	Mr. Rakesh Nai	Senior Engineer, Bharat Benz	Alumni Member

The term of reference for the Board of Studies are as provide in rule 7 of the statutes.

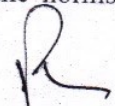
The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is that considered his/her association will contribute in the task of the meeting, with the approval of the President/Vice Chancellor.

The Convener of the meeting is advised to hold meeting of the BOS seeking Convenience of the Chairman. The proceeding of the meeting may send to the VC/Registrar as early as possible.

The External Member shall be entitled for TA/DA and sitting charges as per the norms prescribed by the Mewar University.

Copy to:

1. PS to Hon'ble Chairman (for kind inf)
2. PS to Hon'ble President/Pro-President (for kind inf)
3. All concerned Deans/Directors/HoD's (for kind inf & Necessary action)
4. Accounts/Examination/Library/Store/Warden/Security/IT Head.
5. Coordinator, IQAC Cell.
6. Record File.


Registrar
Mewar University
Gangrar, (Chittorgarh)

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF MECHANICAL ENGINEERING

DATE: 18-06-2020

Minutes of Meeting of Board of Studies

Minutes of the BOS of the Department of Mechanical Engineering meeting held on 18-06-2020 at 11.30 AM.

The following members were present: (Annexure 1)

SN	Name	Designation	Post
1	Dr. Tanveer Ahmed Kazi	Professor & Dean, Faculty of Engg & Technology	Chairman
2	Mr. Kapil Nahar	Assistant Professor & HOD	HOD-Convener
3	Dr. Rakesh Bandhari	Professor & Dean Research Sangam University, Bhilwara	External Member
4	Mr. Upeesh Jain	Sr. Engineer, Jindal Saw Limited, Bhilwara	Member from Industry
5	Dr. Rahul Lodha	Associate Professor	Internal Member 1
6	Mr. Dinesh Kumar	Assistant Professor	Internal Member 1
7	Mr. Sunil Kumar Katheria	Assistant Professor	Internal Member 2
8	Mr. Rakesh Nai	Senior Engineer, Bharat Benz	Alumni Member

Mr. Kapil Nahar (Head, Department of Mechanical Engineering) warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 06-06-2019

Resolution: Minutes of the previous BOS of the Mechanical Engineering Department held on 06-06-2019 were discussed and approved.

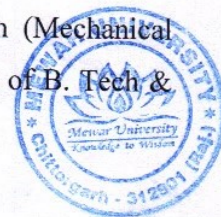
Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mr. Kapil Nahar (Head, Mechanical Engineering) presented departmental activity report mentioning all the activities conducted related to curricular development, research and development, faculty development and Industrial collaboration.

Agenda 3: Revision of Existing Programmes/ Courses

Resolution: The Committee reviewed the scheme and syllabus of B. Tech (Mechanical Engineering) and M. Tech Programme and approved the scheme and syllabus of B. Tech & M. Tech Programme for the session 2020-21.

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Agenda 4: Introduction of New Programmes/ Course

Resolution:

1. As per suggestions received from the members of the previous BOS committee, nine new courses were introduced in the B.Tech Mechanical Engineering for the upcoming session 2020-21 as follows. The detailed syllabus is attached as **Annexure 2**.
 - Failure Analysis and Reliability Engineering
 - Sustainable Energy Systems
 - Supply Chain and Logistics Engineering
 - Engineering for Developing Communities
 - Intelligent Systems and Machine Learning
 - Engineering Project Management
 - Engineering Entrepreneurship
 - Sustainable Manufacturing Principles and Practices
 - Engineering Ethics and Professional Responsibility
2. As per suggestions received from the members of the previous BOS committee, one new course was introduced in the M. Tech. Manufacturing System Engineering for the upcoming session 2020-21 is as follows. The detailed syllabus is attached as **Annexure 3**.
 - Advanced Maintenance Engineering
3. As per suggestions received from the members of the previous BOS committee, one new course was introduced in the M. Tech. Thermal Engineering for the upcoming session 2020-21 is as follows. The detailed syllabus is attached as **Annexure 4**.
 - Energy Management and Sustainability

Agenda 5: Any other suggestions by the BOS committee

Resolution:

- The BOS committee suggested more online/offline interaction with industry experts and students
- The Committee proposed to incorporate AICTE based curriculum.

Agenda 6: To recommend the approved syllabus to Academic Council.


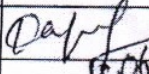
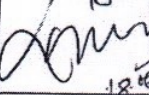
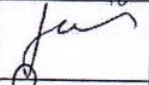
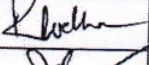
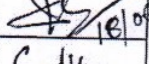


Resolution: Members of the Board of Studies approved the revised syllabus and recommended the same be forwarded to the Academic Council for their approval.

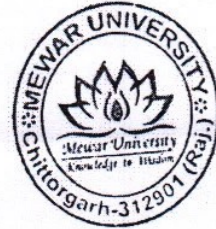
The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.

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Annexure 1: Attendance Sheet

SN	Name	Designation	Post	Signature
1	Dr. Tanveer Ahmed Kazi	Professor & Dean, Faculty of Engg & Technology	Chairman	
2	Mr. Kapil Nahar	Assistant Professor & HOD	HOD-Convener	
3	Dr. Rakesh Bandhari	Professor & Dean Research Sangam University, Bhilwara	External Member	 18/06/20 18/06/20
4	Mr. Upeesh Jain	Sr. Engineer, Jindal Saw Limited, Bhilwara	Member from Industry	
5	Dr. Rahul Lodha	Associate Professor	Internal Member 1	
6	Mr. Dinesh Kumar	Assistant Professor	Internal Member 2	
7	Mr. Sunil Kumar Katheria	Assistant Professor	Internal Member 3	 18/06/20
8	Mr. Rakesh Nai	Senior Engineer, Bharat Benz	Alumni Member	 18/06/20



Failure Analysis and Reliability Engineering

Unit 1: Failure Modes and Mechanisms in Engineering Systems

Introduction to failure analysis: Understanding the different failure modes and mechanisms that can occur in engineering systems, including mechanical, electrical, and material failures.

Failure classification: Categorizing failures based on their nature, such as fatigue, corrosion, wear, fracture, and electrical breakdown.

Root cause analysis: Techniques for identifying the underlying causes of failures

Unit 2: Reliability Analysis and Prediction Methods

Reliability metrics: Introduction to reliability measures, such as failure rate, mean time between failures (MTBF), and probability of failure.

Reliability prediction models: Using statistical methods and historical data to estimate the reliability of engineering systems over time.

Failure data analysis: Applying techniques like Weibull analysis, reliability block diagrams, and fault tree analysis to assess system reliability and identify critical components.

Unit 3: Failure Prevention and Mitigation Strategies

Design for reliability: Incorporating reliability considerations into the design process, including redundancy, fault tolerance, and robustness.

Maintenance and condition monitoring: Implementing preventive and predictive maintenance strategies to detect and mitigate potential failures before they occur.

Failure mitigation techniques: Exploring strategies for reducing the impact of failures, such as emergency response plans, backup systems, and fail-safe mechanisms.

Unit 4: Materials Testing and Characterization for Reliability

Material selection for reliability: Understanding the role of material properties and their impact on system performance and longevity.

Non-destructive testing methods: Introduction to techniques such as ultrasonic testing, X-ray inspection, and thermography for assessing material integrity without causing damage.

Material characterization: Using techniques like tensile testing, hardness testing, and microscopy to evaluate material properties and identify potential failure mechanisms.

Unit 5: Case Studies and Real-World Applications in Failure Analysis

Case studies of failure analysis: Examining real-world examples of failures in various industries, such as aerospace, automotive, electronics, and infrastructure.

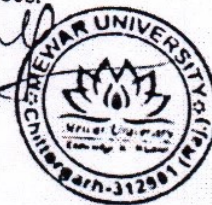
Lessons learned: Analyzing the causes of failures, the impact on safety, costs, and reputation, and the measures taken to prevent similar incidents in the future.

Failure analysis in practice: Understanding the role of failure analysis and reliability engineering in product development, quality control, and maintenance processes.

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Sustainable Energy Systems

Unit 1: Energy Sources, Demand, and Sustainability

Energy sources and their environmental impact: Exploring the different types of energy sources, including fossil fuels, renewable energy, and nuclear energy, and assessing their environmental sustainability.

Energy demand analysis: Understanding the factors influencing energy demand and consumption patterns at the individual, community, and national levels.

Sustainable energy planning: Introduction to energy planning strategies that prioritize sustainability, including energy diversification, energy conservation, and demand-side management.

Unit 2: Renewable Energy Technologies and Systems

Solar energy systems: Exploring photovoltaic (PV) systems, solar thermal technologies, and concentrating solar power (CSP) systems.

Wind energy systems: Understanding the design and operation of wind turbines and wind farms for electricity generation.

Hydropower systems: Examining the principles of hydropower generation and the design of hydroelectric systems.

Geothermal energy systems: Introduction to geothermal heat pumps and geothermal power plants for heating, cooling, and electricity generation.

Unit 3: Energy Storage and Grid Integration

Energy storage technologies: Understanding the various energy storage systems, including batteries, pumped hydro storage, thermal energy storage, and hydrogen storage.

Grid integration of renewable energy: Exploring strategies and technologies for integrating renewable energy sources into the existing power grid, including grid management and energy balancing.

Microgrids and distributed energy systems: Examining decentralized energy systems that incorporate local generation, storage, and consumption for increased resilience and efficiency.

Unit 4: Energy Efficiency and Conservation Strategies

Energy efficiency principles: Understanding the importance of energy efficiency in reducing energy consumption and greenhouse gas emissions.

Building energy efficiency: Exploring strategies for designing energy-efficient buildings, including passive design techniques, insulation, lighting systems, and HVAC (heating, ventilation, and air conditioning) systems.

Industrial energy efficiency: Examining energy-efficient practices and technologies in industrial processes, such as cogeneration, waste heat recovery, and process optimization.

Unit 5: Policy and Economic Aspects of Sustainable Energy

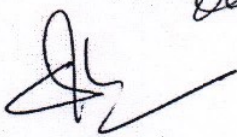
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Renewable energy policies and regulations: Understanding the role of government policies, incentives, and regulations in promoting renewable energy deployment and sustainability.
Economic considerations: Evaluating the cost-effectiveness of sustainable energy systems, including investment analysis, levelized cost of energy (LCOE), and financial incentives.
Socio-economic implications: Examining the social and economic impacts of transitioning to sustainable energy systems, including job creation, energy affordability, and energy access for underserved communities.

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Supply Chain and Logistics Engineering

Unit 1: Fundamentals of Supply Chain Management

Introduction to supply chain management: Understanding the role and importance of effective supply chain management in achieving organizational goals.

Supply chain components: Exploring the different components of a supply chain, including suppliers, manufacturers, distributors, retailers, and customers.

Supply chain coordination: Understanding the coordination and collaboration among supply chain partners to enhance efficiency and customer satisfaction.

Unit 2: Inventory Management and Demand Forecasting

Inventory management strategies: Examining inventory control methods, such as Economic Order Quantity (EOQ), Just-in-Time (JIT), and Vendor Managed Inventory (VMI).

Demand forecasting techniques: Understanding quantitative and qualitative methods for predicting customer demand, such as time series analysis and market research.

Unit 3: Logistics and Distribution Network Design

Transportation management: Exploring modes of transportation, route optimization, and freight consolidation to ensure timely and cost-effective delivery.

Warehousing and storage: Understanding warehouse design, layout optimization, and inventory storage strategies.

Distribution network design: Analyzing factors influencing the location and configuration of distribution centers and warehouses.

Unit 4: Supply Chain Optimization and Performance Measurement

Supply chain modeling and optimization: Introduction to mathematical modeling techniques, such as linear programming and network optimization, to optimize supply chain operations.

Key performance indicators (KPIs): Identifying and measuring KPIs to evaluate supply chain performance, including metrics like on-time delivery, order fulfillment, and inventory turnover.

Continuous improvement: Applying Lean Six Sigma and other improvement methodologies to streamline processes and eliminate waste in the supply chain.

Unit 5: Sustainability and Resilience in Supply Chain Operations

Sustainable supply chain practices: Exploring environmentally and socially responsible initiatives, such as green logistics, reverse logistics, and sustainable sourcing.

Supply chain risk management: Identifying and mitigating risks, including disruptions, supplier dependencies, and geopolitical factors, to ensure supply chain resilience.

Crisis response and business continuity: Developing contingency plans and strategies to handle unexpected events, such as natural disasters or global crises, and maintain operational continuity.

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Engineering for Developing Communities

Unit 1: Challenges and Opportunities in Developing Communities

Understanding the unique challenges faced by developing communities, such as limited access to resources, inadequate infrastructure, and socio-economic disparities.

Identifying opportunities for engineering interventions to improve the quality of life and promote sustainable development in these communities.

Recognizing the importance of cultural sensitivity, collaboration, and community engagement in addressing the needs of developing communities.

Unit 2: Infrastructure Planning and Development

Infrastructure assessment and planning: Conducting assessments of existing infrastructure and developing plans for the construction or improvement of essential infrastructure, such as roads, bridges, and utilities.

Design considerations: Incorporating factors such as cost-effectiveness, sustainability, resilience, and adaptability to the local context in infrastructure design.

Project management: Understanding the principles of project management and applying them to infrastructure development projects in developing communities.

Unit 3: Water and Sanitation Engineering

Access to clean water: Exploring technologies and strategies for providing safe drinking water in resource-limited settings, including water treatment, distribution systems, and water quality monitoring.

Sanitation solutions: Designing appropriate sanitation systems, such as improved toilets, waste management, and wastewater treatment, to improve hygiene and public health.

Community-based approaches: Implementing participatory approaches and community engagement to ensure sustainable water and sanitation solutions that meet the needs of the local population.

Unit 4: Sustainable Technologies for Resource-Limited Settings

Renewable energy solutions: Exploring sustainable energy technologies, such as solar power, biomass, and micro-hydropower, to meet the energy needs of developing communities.

Affordable housing and construction techniques: Introducing low-cost and sustainable building materials and construction methods suitable for resource-limited settings.

Appropriate technology selection: Identifying and adapting technologies that are culturally appropriate, affordable, and easily maintainable in developing communities.

Unit 5: Socio-economic Considerations and Community Engagement

Socio-economic impact assessment: Evaluating the potential social and economic impacts of engineering interventions in developing communities, including job creation, income generation, and community empowerment.

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Intelligent Systems and Machine Learning

Unit 1: Intelligent Systems and Their Applications

Introduction to intelligent systems: Understanding the concept of intelligent systems and their applications in various fields, such as healthcare, finance, transportation, and robotics.

Intelligent agents: Exploring the characteristics and components of intelligent agents, including perception, reasoning, and decision-making.

Case studies: Examining real-world examples of intelligent systems, such as autonomous vehicles, virtual assistants, and recommendation systems.

Unit 2: Machine Learning Algorithms and Techniques

Supervised learning: Understanding the principles of supervised learning and exploring algorithms such as linear regression, logistic regression, and support vector machines.

Unsupervised learning: Introduction to unsupervised learning algorithms, including clustering techniques (k-means, hierarchical clustering) and dimensionality reduction methods (principal component analysis, t-SNE).

Reinforcement learning: Exploring the basics of reinforcement learning and its applications in training intelligent agents through trial-and-error interactions.

Unit 3: Data Preprocessing and Feature Selection

Data cleaning and preprocessing: Understanding the steps involved in data cleaning, handling missing values, dealing with outliers, and normalizing data.

Feature selection and extraction: Exploring techniques for selecting relevant features and reducing dimensionality, such as filter methods, wrapper methods, and principal component analysis (PCA).

Unit 4: Decision Trees, Neural Networks, and Support Vector Machines

Decision tree algorithms: Understanding the principles of decision tree learning, including ID3, C4.5, and CART algorithms, and their applications in classification and regression tasks.

Neural networks: Exploring the architecture and training algorithms of artificial neural networks, including feedforward networks, backpropagation, and deep learning models.

Support vector machines (SVM): Understanding the principles of SVM and its use in binary classification and regression tasks, including kernel methods and soft-margin SVM.

Unit 5: Intelligent Systems in Pattern Recognition and Decision-Making

Pattern recognition: Exploring techniques for pattern recognition and image classification using intelligent systems, such as convolutional neural networks (CNN) and deep learning models.

Natural language processing: Understanding how intelligent systems can process and understand human language, including techniques for sentiment analysis, text classification, and language translation.

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Decision-making with intelligent systems: Examining how intelligent systems can support decision-making processes, including expert systems, recommendation systems, and reinforcement learning-based decision-making.

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Engineering Project Management

Unit 1: Project Planning, Scheduling, and Budgeting

Project initiation: Understanding the process of defining project objectives, scope, deliverables, and stakeholders.

Work breakdown structure (WBS): Creating a hierarchical breakdown of project tasks and subtasks to facilitate planning and resource allocation.

Project scheduling techniques: Exploring techniques such as Gantt charts, critical path method (CPM), and project network diagrams for scheduling project activities.

Cost estimation and budgeting: Estimating project costs, developing a budget, and monitoring financial resources throughout the project lifecycle.

Unit 2: Risk Management and Quality Assurance

Risk identification and assessment: Identifying potential risks and analyzing their impact on project objectives, developing risk mitigation strategies.

Quality planning and control: Establishing quality objectives, defining quality metrics, and implementing quality control measures to ensure project deliverables meet the required standards.

Change management: Developing strategies to manage and respond to changes that may occur during the project, including scope changes and stakeholder requests.

Unit 3: Team Management and Leadership Skills

Team building and development: Building an effective project team, establishing roles and responsibilities, and fostering a collaborative work environment.

Leadership styles and techniques: Understanding different leadership styles and applying appropriate leadership techniques to motivate and guide project team members.

Conflict resolution: Identifying and managing conflicts within the project team or with stakeholders to maintain a positive working environment.

Unit 4: Communication and Stakeholder Engagement

Effective communication strategies: Developing communication plans, utilizing various communication channels, and ensuring timely and accurate information flow among project team members and stakeholders.

Stakeholder analysis and engagement: Identifying project stakeholders, analyzing their interests and influence, and developing strategies to engage and manage their expectations throughout the project.

Unit 5: Project Evaluation and Post-Project Analysis

Project evaluation techniques: Conducting project performance evaluations, assessing project outcomes against predefined success criteria, and identifying lessons learned.

Post-project analysis: Analyzing project results, identifying areas for improvement, and documenting best practices for future projects.

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Project closure: Formalizing project closure activities, including project documentation, archiving, and conducting post-implementation reviews to evaluate project success and identify opportunities for continuous improvement.

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Engineering Entrepreneurship

Unit 1: Introduction to Entrepreneurship and Innovation

Understanding the principles and mindset of entrepreneurship.
Exploring the importance of innovation in engineering entrepreneurship.
Studying successful entrepreneurial stories and case studies.

Unit 2: Market Analysis and Opportunity Identification

Conducting market research and analysis to identify potential opportunities.
Understanding customer needs, market trends, and competitive landscapes.
Evaluating the feasibility and viability of business ideas.

Unit 3: Intellectual Property and Patenting

Understanding intellectual property rights and their significance in engineering entrepreneurship.
Exploring the process of patenting inventions and protecting intellectual property.
Learning strategies for managing intellectual property assets.

Unit 4: Business Planning and Financial Management

Developing a business plan, including mission statement, value proposition, target market, and marketing strategies.
Financial planning and forecasting, including revenue projections, cost analysis, and financial risk assessment.
Exploring funding options, such as bootstrapping, venture capital, and crowdfunding.

Unit 5: Team Building and Pitching Skills

Building an entrepreneurial team with complementary skills and roles.
Developing effective communication and leadership skills.
Mastering the art of pitching ideas to investors, stakeholders, and potential customers.
Throughout the course, students will have the opportunity to work on real-world projects, collaborate in teams, and engage with industry experts and entrepreneurs through guest lectures and networking events. The course will culminate in a final project where students will pitch their business ideas and demonstrate their entrepreneurial skills.

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Community engagement strategies: Involving local communities in the decision-making process, project planning, and implementation to ensure their needs and perspectives are considered.

Capacity building and knowledge transfer: Promoting skills development, knowledge sharing, and technology transfer to empower local communities and build long-term sustainability.

S. H. R. *Abdullah*



Sustainable Manufacturing

Unit 1: Sustainable Manufacturing Principles and Practices

Understanding the concept of sustainable manufacturing and its importance in addressing environmental and social challenges.

Exploring the principles of sustainable manufacturing, such as minimizing resource consumption, reducing emissions, and promoting social responsibility.

Studying sustainable manufacturing frameworks and certifications, such as ISO 14001 and LEED.

Unit 2: Resource Efficiency and Waste Reduction in Manufacturing Processes

Implementing lean manufacturing principles to reduce waste and optimize resource utilization.

Identifying and implementing energy-efficient technologies and practices in manufacturing processes.

Applying strategies for water conservation, material efficiency, and waste reduction.

Unit 3: Circular Economy and Closed-Loop Manufacturing

Understanding the principles of the circular economy and its application in manufacturing.

Designing products and processes for disassembly, remanufacturing, and recycling.

Exploring closed-loop supply chains and reverse logistics for product recovery and material reuse.

Unit 4: Sustainable Supply Chain Management

Integrating sustainability principles into supply chain management practices.

Assessing and managing environmental and social risks in the supply chain.

Collaborating with suppliers and partners to promote sustainable practices and ethical sourcing.

Unit 5: Life Cycle Assessment and Eco-Design in Manufacturing

Conducting life cycle assessments (LCA) to evaluate the environmental impacts of products and processes throughout their life cycle.

Applying eco-design principles to minimize environmental impacts and optimize product performance.

Incorporating sustainability criteria into product design and development processes.

Throughout the course, students will engage in case studies, group projects, and hands-on exercises to apply sustainable manufacturing principles and develop practical solutions. They

will also explore emerging trends and technologies in sustainable manufacturing, such as additive manufacturing, smart factories, and digitalization.

S. J. K. *A. J.* *S. J. K.*



Engineering Ethics and Professional Responsibility

Unit 1: Ethical Theories and Frameworks in Engineering

Introduction to major ethical theories and frameworks relevant to engineering, such as consequentialism, deontology, and virtue ethics.

Understanding the ethical dimensions and challenges specific to engineering practice.

Analyzing case studies and ethical dilemmas from engineering contexts.

Unit 2: Professional Codes of Conduct and Responsibilities

Exploring professional codes of conduct and ethics for engineers, such as those provided by engineering societies and organizations.

Understanding the responsibilities of engineers towards society, clients, colleagues, and the environment.

Examining the role of ethical guidelines in promoting integrity and professionalism in engineering practice.

Unit 3: Ethical Decision-Making in Engineering Practice

Ethical decision-making models and frameworks applicable to engineering practice, such as the "ethical decision tree" or "ethical reasoning process."

Analyzing and evaluating the ethical implications of engineering decisions and actions.

Considering factors such as safety, risk, sustainability, and stakeholder interests in ethical decision-making.

Unit 4: Social and Environmental Impacts of Engineering Projects

Understanding the social, cultural, and environmental impacts of engineering projects on local and global communities.

Exploring issues related to social justice, equity, and access in engineering practice.

Evaluating the role of engineers in addressing societal and environmental challenges.

Unit 5: Ethical Considerations in Emerging Technologies

Examining ethical considerations and challenges posed by emerging technologies, such as artificial intelligence, genetic engineering, and autonomous systems.

Discussing privacy, data security, transparency, and fairness in the development and deployment of emerging technologies.

Considering the role of engineers in shaping the responsible and ethical use of emerging technologies.

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**OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)**

Ref. No.: MU/RO/2020/372

21st October 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Paramedical Science

The Board of Studies for the Department of Paramedical Science is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

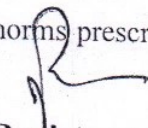
- | | |
|--|-------------------|
| 1) Prof. (Dr.) C.K. Sharma, Dean, Faculty of Health Science | - Chairman |
| 2) Dr. K.C. Jain, Radiologist | - External Member |
| 3) Dr. Faiq Ahmad, Medical Officer | - Internal Member |
| 4) Dr. S.L. Mundra, Senior Medical Officer | - Internal Member |
| 5) Ms.Aasia Sofi | - Alumni |
| 6) Mrs. Jaya Bharti, Head & Assistant professor | - Convener |

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the first week of Dec 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.


**Registrar
Registrar
Mewar University
Gangrar, (Chittorgarh)**

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF PARAMEDICAL SCIENCES

DATE: 05.12.2020

Minutes of Meeting of Board of Studies

The Board of Studies meeting of the Department of Paramedical Sciences was held on 05th December 2020 in Room No. 135 at 11:00 am onwards to approve the new curriculum and syllabus for session 2019-20.

The following members were present: **(Annexure 1)**

- | | |
|---|-------------------|
| 1) Prof. (Dr.) C.K. Sharma, Dean, Faculty of Health Science | - Chairman |
| 2) Dr. K.C. Jain, Radiologist | - External Member |
| 3) Dr. Faiq Ahmad, Medical Officer | - Internal Member |
| 4) Dr. S.L. Mundra, Senior Medical Officer | - Internal Member |
| 5) Ms. Aasia Sofi | - Alumni |
| 6) Mrs. Jaya Bharti, Head & Assistant professor | - Convener |

Mrs. Jaya Bharti (Head, Department of Paramedical) warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 07-06-2019

Resolution: Minutes of the previous BOS of the Paramedical Department held on 07-06-2019 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mrs. Jaya Bharti (Head, Paramedical Science) presented a departmental activity report mentioning all the activities conducted related to curricular development, research development, faculty development and Industrial collaboration.

Agenda 3: Review of Existing Programmes/Courses

Resolution: The Committee reviewed and approved the scheme and syllabus of courses for BMLT, B.Sc Cardiac Care, M.Sc MLT and BRIT for the upcoming session from 2020-21. **(Annexure 2)**

Agenda 4: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.



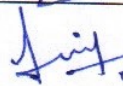
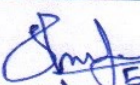

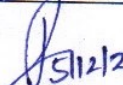


MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF PARAMEDICAL SCIENCES

DATE: 05.12.2020

Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Prof. (Dr.) C.K. Sharma, Dean Academics, MU	Chairman	 5/12/2020
2	Dr. K.C. Jain, Radiologist	External Member	 5/12/2020
3	Dr. Faiq Ahmad, Medical Officer	Internal Member	 5/12/2020
4	Dr. S.L. Mundra, Senior Medical Officer	Internal Member	 5/12/2020
5	Ms. Aasia Sofi	Alumni	 5/12/2020
6	Ms. Jaya Bharti, Head, Paramedical	Convener	 5/12/2020

**OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)**

Ref. No.: MU/RO/2020/535

18-06-2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Pharmacy

The Board of Studies for the Department of Department of Pharmacy is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

1) Dr. Kaushal Kishor Chandrul, Professor & Dean	Chairman
2) Dr. Rajesh Verma, Professor, Apex University, Jaipur	External Member 1
3) Dr. Vinesh Chaudhary, Professor, LBS College of Pharmacy, Jaipur	External Member 2
4) Roselyn Khaklary, Pharmacist	Alumni
5) Mr. Amit Khandelwal, Elocon Pharmaceutical Pvt Ltd, Jaipur	Member from Industry
6) Ms. Sarita Sharma, Assistant Professor	Internal Member 1
7) Ms. Ankita Sharma, Assistant Professor	Internal Member 2
8) Mr Pankaj Chasta, Assistant Professor	Internal Member 3
9) Dr. Gaurav Kumar Sharma, Associate Professor & HOD	Convener

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

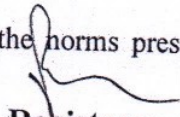
The Chairman of the Board of Studies may associate any member in the meeting, as a special invitee if it is considered his association will contribute to the task of the meeting with the approval of the President/Vice-Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking the convenience of the Chairman in the third week of June 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled to TA/DA and sitting fees as per the norms prescribed by Mewar University.

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
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- Coordinator, IQAC Cell.
- Record file.


**Registrar
Registrar
Mewar University
Gangrar, (Chittorgarh)**

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF PHARMACY

DATE: 18-06-2020

Minutes of Meeting of Board of Studies

The Board of Studies Meeting of the Department of Pharmacy, Faculty of Medical, Surgical and Paramedical was held on 18th June 2020 in Room No. 135 at 10:00 am onwards to approve the new/changes in curriculum and Syllabus revision for session 2020-21. The following members were present: **(Annexure 1)**

- | | |
|---|----------------------|
| 1) Dr. Kaushal Kishor Chandrul, Professor & Dean | Chairman |
| 2) Dr. Rajesh Verma, Professor, Apex University, Jaipur | External Member 1 |
| 3) Dr. Vinesh Chaudhary, Professor, LBS College of Pharmacy, Jaipur | External Member 2 |
| 4) Roselyn Khaklary, Pharmacist | Alumni |
| 5) Mr. Amit Khandelwal, Elocon Pharmaceutical Pvt Ltd, Jaipur | Member from Industry |
| 6) Ms. Sarita Sharma, Assistant Professor | Internal Member 1 |
| 7) Ms. Ankita Sharma, Assistant Professor | Internal Member 2 |
| 8) Mr Pankaj Chasta, Assistant Professor | Internal Member 3 |
| 9) Dr. Gaurav Kumar Sharma, Associate Professor & HOD | Convener |

Agenda 1: Grant of leave of absence member, if any

Resolution: No one was absent

Agenda 2: Welcoming the New Members

Resolution: Mr. Gaurav Kumar Sharma, Head of the Department of Pharmacy, warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 3: Minutes of the previous Meeting of the Board of Studies of the Department of Pharmacy, Mewar University

Resolution: Minutes of the previous BOS of the Pharmacy Department held on 01-07-2019 were discussed and approved.

Agenda 4: Introduce the new programme/course for the upcoming session

Resolution: As per the recommendation of the members of the previous BOS committee, it is decided that a new programme M. Pharma (Pharmaceutics) started by the Department of Pharmacy in the upcoming session 2020-21. The detailed syllabus and scheme are enclosed here. **(Annexure 2)**

Department of Pharmacy
Mewar University
Gangrar, Chittorgarh

The main objectives of the Course are:

- To promote professional practice management skills in hospital and pharmaceutical industries (quality control and quality assurance).
- To promote entrepreneurship and abilities to manage the independent drug store/pharmacy.
- To groom in a manner that they can do patient counseling and able to supply quality medicines to patients.
- To prepare the students/learners to be good professionals in the pharmaceutical industry.

Agenda 5: Introduce the value-added course

Resolution: Department of Pharmacy offers Training / Internships which are conducted every year. These sessions are conducted by experts and help students stand apart from the rest in the job market by adding further value to their resumes. They are mostly independent of each type of field. (**Annexure-3**)

S.No.	Name of the value-added courses/ Internships	Course Code	Year of offering	Duration of course/ Internships
1.	B. Pharm – Short-term training	BP	2019-20	01 Months
2.	D. Pharm - Short-term training	DPH	2019-20	03 Months

The main objectives of the Value Added Course are:

- To provide students with an understanding of the expectations of industry.
- To improve the employability skills of students.
- To bridge the skill gaps and make students industry ready.
- To provide an opportunity for students to develop interdisciplinary skills.
- To mold students as job providers rather than job seekers.

Guidelines for conducting value-added courses/Internship:-

These are the training/internship which is conducted in collaboration with well-known pharmaceutical industries like Oniosome, CTSD (Center for Training & skill development), Mohali and Royal Research Centre Gujrat. The B. Pharma and D. Pharma students will be sent to this internship at the end of the final semesters.

PRINCIPAL
Department of Pharmacy
Mewar University
Gangrar, Chittorgarh


Duration:-

The duration of training/internship is 1 month/150 hours for B. Pharma in the pharmaceutical industry and 3 months/500 hours in the hospital as per mentioned by the Pharmacy Council of India (PCI).

Agenda 6: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the revised syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was concluded with a gentle thank you by the Chairperson Prof. (Dr.) Kaushal Kishor Chandrul, Department of Pharmacy.


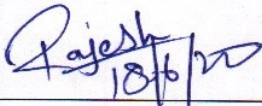
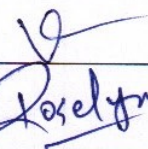

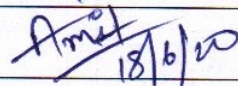

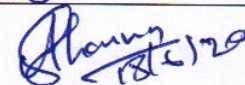



PRINCIPAL
Department of Pharmacy
Mewar University
Gangrar, Chittorgarh

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF PHARMACY

DATE: 18-06-2020

Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Dr. Kaushal Kishor Chandrul, Professor & Dean	Chairman	
2	Dr. Rajesh Verma, Professor, Apex University, Jaipur	External Member 1	 18/6/20
3	Dr. Vinesh Chaudhary, Professor, LBS College of Pharmacy, Jaipur	External Member 2	
4	Roselyn Khaklary, Pharmacist	Alumni	
5	Mr. Amit Khandelwal, Elocon Pharmaceutical Pvt Ltd, Jaipur	Member from Industry	 18/6/20
6	Ms. Sarita Sharma, Assistant Professor	Internal Member 1	
7	Ms. Ankita Sharma, Assistant Professor	Internal Member 2	 18/6/20
8	Mr Pankaj Chasta, Assistant Professor	Internal Member 3	
9	Dr. Gaurav Kumar Sharma, Associate Professor & HOD	Convener	

PRINCIPAL
Department of Pharmacy
Mewar University
Gangrar, Chittorgarh

**OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)**

Ref. No.: MU/RO/2020/ 751

21th August, 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for The Department of Management

The Board of Studies for the The department of Management is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

- 1) Prof. (Dr.) Chetali Agarwal, Professor, Faculty of Management and Commerce
- Chairman
- 2) Prof. (Dr.) Pradeep Kumar Khicha, Govt. PG College, Nathdwara
- External Member
- 3) Prof. (Dr.) Abhay Jaroli, Dean, FCM, B.N. University, Udaipur
- External Member
- 4) Mr. Raj Singh, Assistant Professor
- Internal Member
- 5) Mr. Vikram Singh Rao, Assistant Professor
- Internal Member
- 6) Mr. Suhail Hamid Dar, Business Developer, BYJU'S, Noida
- Alumni
- 7) Mr. Rajesh Bhatt, Head & Assisatnt Professor
- Convener

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the last week of September 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.


Registrar

Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY
THE DEPARTMENT OF MANAGEMENT
Minutes of the Board of Studies (BOS)

MINUTES OF THE MEETING OF THE BOARD OF STUDIES IN THE THE DEPARTMENT OF MANAGEMENT HELD ON MONDAY, SEPTEMBER 28, 2020 10.30 A.M. AT MEWAR UNIVERSITY, ROOM NO. 333, GANGRAR, CHITTORGARH-312901.

CONTENTS

S. No.	Agenda
1.1	Grant of leave of absence member, if any
1.2	Welcoming the New Members
1.3	Minutes of the previous Meeting of the Board of Studies of the Department of Management, Mewar University
1.4	Follow-up actions on the Minutes of the previous meetings of the Board of Studies of the Department of Management, Mewar University
1.5	Proposed Agenda of BOS.
1.6	Resolved the Issue as per the Proposed Agenda
1.7	Any other item with the permission of the Chair.

Item 1.1 Grant of Leave of Absence, if any

All the members and one external member were present at the time of the Meeting, Therefore absentee was marked.

Item 1.2 Welcoming the New Members:

The Chairperson Dr. Chetali Agarwal welcomed the Members for attending the meeting of the Board of Studies. The Chairperson further expressed special thanks to Dr. Pradeep Kumar Khicha –Govt. PG College, Nathdwara, and Dr. Abhay Jaroli- Dean, FCM, B.N. University, Udaipur for sparing the time from their busy schedule to attend the meeting.

Dr. Chetali Agarwal, Chairperson briefed the meeting in front of members of BOS. The list of members is mentioned in Annexure I.

Rajesh Bhatt, Assistant Professor & Head (Department of Management) formally welcomed all the members of the Board of Studies and thereafter the Agenda items are discussed and resolved as follows:

Item No.1.3: To confirm the minutes of the Meeting of BOS held on 10-06-2019, The Board considered and confirmed the minutes of its previous meeting held on 10th June 2019



Item No. 1.4: Follow-up actions on the Minutes of the previous meeting dated 10-06-2019

The Board members noted the action taken, where necessary, on the various decisions taken in its meeting held on 10-06-2019. The Board also expressed its satisfaction with the action taken report on the various decisions taken in its meeting held on 10th June 2019.

Item No. 1.5: Proposed Agenda of BOS For The Addition of New Courses

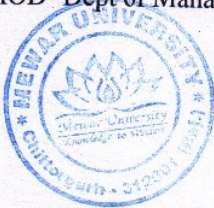
- The BOS committee Members agreed to introduce one new course for BBA students in semester 5th from the upcoming session 2020-21. The courses are mentioned below. **(Annexure 2)**
 1. Production Methods
- The BOS committee Members agreed to introduce one new course for MBA students in the semester 4th from the upcoming session 2020-21. The courses are mentioned below. **(Annexure 3)**
 1. Sales & Distribution Management

Item No. 1.7: Any other item with the permission of the Chair

There being no other matter, the meeting was concluded with a vote of thanks to the chair.

(Rajesh Bhatt)

HOD- Dept of Management



MEWAR UNIVERSITY
DEPARTMENT OF MANAGEMENT

Date of the meeting: 28-09-2020

Venue: Room No: - 333

Members present:-

SN	Name	Designation	Post	Signature
1	Dr. Chetali Agarwal	Professor	Chairman	<i>Chetali</i>
2	Rajesh Bhatt	Assistant Professor & HOD	Convener	<i>Rajesh Bhatt</i> 28/9/20
3	Dr. Pradeep Kumar Khicha	Govt. PG College, Nathdwara	External Member 1	<i>Pradeep Kumar Khicha</i> 28/9/20
4	Dr. Abhay Jaroli	Dean, FCM, B.N. University, Udaipur	External Member 2	<i>Dr. Abhay Jaroli</i> 28/9/20
5	Mr. Vikram Singh Rao	Manager (MR Consultant)	Internal Member 1	<i>Vikram Singh Rao</i> 28/9/20
6	Mr. Raj Singh	Territory Technical Manager (Ultratech Cement)	Internal Member 2	<i>Raj Singh</i> 28/9/20
7	Mr. Suhail Hamid Dar	Business Developer, BYJU'S, Noida	Alumni	<i>Suhail Hamid Dar</i> 28/9/20

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH

PRODUCTION METHODS

Unit 1 –

Production Management – Meaning definition, function, Historical development concept. Production system, Responsibilities of Production, Manager Production Planning – Introduction levels of production planning. Planning and manufacturing system. Objectives of Production Planning. Production Control – Definition, Necessity, Objective. Difference between Production Planning and control.

Unit 2 –

Manufacturing System_ Introduction, Classification of goods & services, Introduction manufacturing system job, Batch Production, Continuous manufacturing System – Mass Process Production. Plant Location – Factors affecting, plant location, location analysis Quantizations vs Equalizations. Plant – Meaning and definition, objectives, features types of layout, Production Process.

Unit 3 –

Work Study – Meaning, Technique of method study, Process charts, work sampling, Routing scheduling. Quality control & inspection – Inspection. Acceptance Sampling. Producer's Consumer's Risk. Sampling Plans. Statistical Quality Control. Control Charts.

Reference:

Production and Operation Management – Cherry & Cherry
Production Management – C. B. Gupta
Production and Operation Management – Sharma and Agarwal



MEWAR UNIVERSITY, GANGRAR, CHITTORGARH

Sales & Distribution Management

Unit

1

Sales Management – Meaning, Objectives, Sales executives as coordinators, sales management and control, personal selling, different types of personal selling situation, personal selling process, sales forecasting.

Sales Force Management – Organization, sales force planning, profiling, recruiting, training, motivation and compensation.

Unit 2

Sales Administration & Control – Sales Analysis, Sales quotas, sales budget, sales territory average, sales audit.

Physical Distribution - Nature and scope of physical distribution, order processing, distribution strategies, warehousing and transportation – types and selection.

Unit 3

Channel Design Management – needs and importance of intermediaries, function of channel members, establishing channel objectives and constraints, identifying and evaluating major channel members, channel conflicts and their resolutions.

Reference:

Sales Management by Recharad R Still & Cundiff.



OFFICE OF THE REGISTRAR

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2020/507

28th May 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Law

The Board of Studies for the Department of Law is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

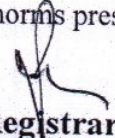
- | | |
|--|-------------------|
| 1) Prof. (Dr.) P.S. Varshney, Dean, Faculty of Legal Studies | - Chairman |
| 2) Dr. D.K. Sharma, Member, BCI, Nainital, Uttarakhand | - External Member |
| 3) Dr. M.L. Pitliya Dean & Professor (Sangam University) | - External Member |
| 4) Mr. Shirish Shukla, Assistant Professor | - Internal Member |
| 5) Mr. Amit Dadhich, Assistant Professor, | - Internal Member |
| 6) Mr. Rajesh Bhatt, Assistant Professor | - Internal Member |
| 7) Mr. Raj Singh, Assistant Professor | - Internal Member |
| 8) Ms. Lavina Chaplot, Assistant Professor | - Convener |

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the 1st week of June 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.


Registrar
Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
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- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF LAW

05th June 2020

Minutes of Meeting of Board of Studies

The Board of Studies meeting of the Department of Law was held on 05th June 2020 in Room No. 135 at 11:00 am onwards to approve the new/changes in curriculum and syllabus revision for session 2020-21.

The following members were present: **(Annexure 1)**

- | | |
|--|-------------------|
| 1) Prof. (Dr.) P.S. Varshney, Dean, Faculty of Legal Studies | - Chairman |
| 2) Dr. D.K. Sharma, Member, BCI, Nainital, Uttarakhand | - External Member |
| 3) Dr. M.L. Pitliya Dean & Professor (Sangam University) | - External Member |
| 4) Mr. Shirish Shukla, Assistant Professor | - Internal Member |
| 5) Mr. Amit Dadhich, Assistant Professor, | - Internal Member |
| 6) Mr. Rajesh Bhatt, Assistant Professor | - Internal Member |
| 7) Mr. Raj Singh, Assistant Professor | - Internal Member |
| 8) Ms. Lavina Chaplot, Assistant Professor | - Convener |

At the outset, Ms. Lavina Chaplot (Head, Department of Law) warmly welcomed all the board members. The head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 15-06-2019

Resolution: Minutes of the previous BOS of the Law department held on 15-06-2019 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Ms. Lavina Chaplot (Head, Department of Law) presented departmental activity conducted related to curricular development, research development, and faculty development of Law.

Agenda 3: Review and approval of Existing Programmes/Courses

Resolution: Ms. Lavina Chaplot (Head, Department of Law) presented the ongoing syllabus of B.A LL.B (Hons.), BBA LL.B (Hons.), LL.B and LL.M. The BOS committee reviewed and approved the scheme and syllabus for the upcoming session 2020-21 **(Annexure 2)**



Agenda 4: Introduction of New Programme/Courses to be added.

Resolution: As per the recommendation of the members of the BOS committee, it is decided to introduce P.G. Diploma (one year) in cyber law, labour law from the session 2020-2021. The detailed syllabus and scheme enclosed as (Annexure 3)

Agenda 5: To recommend the approved syllabus to Academic Council

Resolution: Members of the Board of Studies approved the revised syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.

Chairman
5/6/20



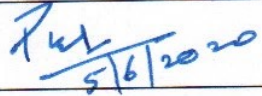
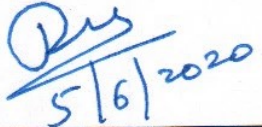
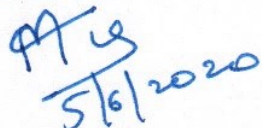
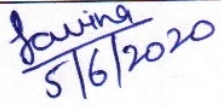
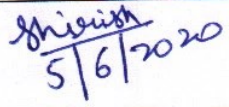
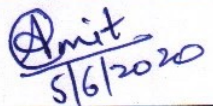
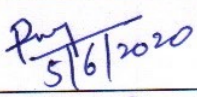
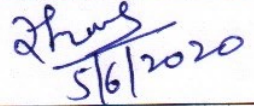
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF LAW

DATE: 5th June 2020

Annexure 1: Attendance Sheet

Following members were present in the Board of Studies meeting:

S.NO.	NAME OF MEMBERS		SIGNATURE
1.	Prof. (Dr.) P.S VARSHNEY	CHAIRMAN	
2.	Dr. D.K. Sharma, Member, BCI, Nainital, Uttarakhand	External Member	
3.	Dr. M.L. Pitliya Dean & Professor (Sangam University)	External Member	
4.	Ms. LavinaChaplot Assistant Professor	CONVENOR	
5.	Mr. SHIRISH KUMAR SHUKLA Assistant Professor	MEMBER	
6.	Mr. Amit Dadhich Assistant Professor	MEMBER	
7.	Mr. Rajesh Bhatt Assistant Professor	MEMBER	
8.	Mr. Raj Singh Assistant Professor	MEMBER	

Annexure 1: Attendance Sheet

Prof. (Dr.) P.S. VARSHNEY

Chairman

OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2020/397-A

04th March, 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Chemical Engineering

The Board of Studies for the Department of Chemical Engineering is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

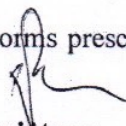
- | | |
|--|-------------------|
| 1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering | - Chairman |
| 2) Prof. (Dr.) Mr. Mahesh Kumar Singla- Senior Engineer, Hindustan Zinc. | - External Member |
| 3) Prof. (Dr.) Pankaj Kumar Pandey-Amity University Jaipur | - External Member |
| 4) Mr. Dinesh Kumar, Assistant Professor | - Internal Member |
| 5) Mr. Sunil Kumar Katheria, Assistant Professor | - Internal Member |
| 6) Mr. Rahul Kumar, Head & Assistant Professor | - Convener |

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as special invitee if it is considered his association will contribute in the task of the meeting with the approval of the President/Vice Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking convenience of the Chairman in the first week of June 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled for TA/DA and sitting fees as per the norms prescribed by the Mewar University.


Registrar
Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF CHEMICAL ENGINEERING

DATE: 05.06.2020

Minutes of Meeting of Board of Studies

The Board of Studies Meeting of the Department of Chemical Engineering, Faculty of Engineering and Technology was held on 05th June 2020 in Room No. 135 at 10:00 am onwards to approve the new/changes in curriculum and Syllabus revision for session 2020-21.

The following members were present: **(Annexure 1)**

- | | |
|--|-------------------|
| 1) Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering | - Chairman |
| 2) Prof. (Dr.) Mr. Mahesh Kumar Singla- Senior Engineer, Hindustan Zinc. | - External Member |
| 3) Prof. (Dr.) Pankaj Kumar Pandey-Amity University Jaipur | - External Member |
| 4) Mr. Dinesh Kumar, Assistant Professor | - Internal Member |
| 5) Mr. Sunil Kumar Katheria, Assistant Professor | - Internal Member |
| 6) Mr. Rahul Kumar, Head & Assistant Professor | - Convener |

At the outset, Mr. Rahul Kumar (Head, Chemical Engineering) warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 05-06-2019

Resolution: Minutes of the previous BOS of the Chemical Engineering Department held on 05-06-2019 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Mr. Rahul Kumar presented departmental activities conducted related to curricular development, research development, faculty development and Industrial collaboration were presented.

Agenda 3: Review in any Programme/Course

Resolution: No changes were made to the approved scheme and syllabus of the course B. Tech. in Chemical Engineering.



Agenda 4: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.


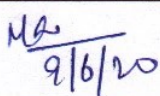
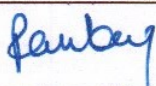
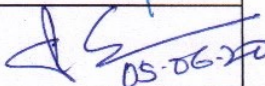
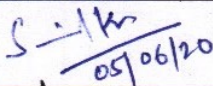



MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF CHEMICAL ENGINEERING

DATE: 05.06.2020

Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Prof. (Dr.) Tanveer Ahmed Kazi, Dean, Engineering	Chairman	
2	Prof. (Dr.) Mr. Mahesh Kumar Singla	External Member	 9/6/20
3	Prof. (Dr.) Pankaj Kumar Pandey	External Member	
4	Mr. Dinesh Kumar, Assistant Professor	Internal Member	 05-06-20
5	Mr. Sunil Kumar Katheria, Assistant Professor	Internal Member	 05/06/20
6	Mr. Rahul Kumar, Head & Assistant Professor	Convener	



OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.: MU/RO/2020/ 518 -A

10th June 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Agriculture

The Board of Studies for the Department of Agriculture is reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

- | | |
|---|-------------------|
| 1. Prof. (Dr.) Arvind Rajpurohit, Dean, Faculty of Agri. & Vet. Sc. | - Chairman |
| 2. Prof. (Dr.) A. L. Tapadiya, Rtd. Professor, RCA Udaipur | - External Member |
| 3. Prof. (Dr.) M. S. Shaktawat rtd. Professor, RCA Udaipur | - External Member |
| 4. Mr. Brijesh Kumar Meena, Assistant Professor, Agriculture. | - Internal Member |
| 5. Mr. Omprakash Regar, Assistant Professor, Agriculture | - Internal Member |
| 6. Mr. K K Bhati, Associate Professor, Agriculture | - Internal Member |
| 7. Dr. Neelu Jain, Associate Professor, Agriculture | - Internal Member |
| 8. Mr. Piyush Sharma, MPUAT, Udaipur | - Alumni |
| 9. Mr. Gautam Singh Dhaked, Head, Agriculture. | - Convener |

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

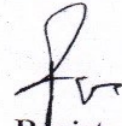
The Chairman of the Board of Studies may associate any member in the meeting, as a special invitee if it is considered his association will contribute to the task of the meeting with the approval of the President/Vice-Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking the convenience of the Chairman on the second week of July 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled to TA/DA and sitting fees as per the norms prescribed by Mewar University.

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoDs (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.



Registrar

Registrar

Mewar University
Gangrar, (Chittorgarh)

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF AGRICULTURE

DATE: 14.07.2020

Minutes of Meeting of Board of Studies

Minutes of the BOS of the Department of Agriculture meeting held on 14-07-2020 at 11.30 AM.
The following members were present: (Annexure 1)

- | | |
|--|-------------------|
| 1. Prof. (Dr.) Arvind Rajpurohit, Dean, Faculty of Agri. & Vet. Sc. | - Chairman |
| 2. Prof. (Dr.) A. L. Tapadiya, Rtd. Professor, RCA Udaipur | - External Member |
| 3. Prof. (Dr.) M. S. Shaktawat rtd. Professor, RCA Udaipur | - External Member |
| 4. Mr. Brijesh Kumar Meena, Assistant Professor, Agriculture. | - Internal Member |
| 5. Mr. Omprakash Regar, Assistant Professor, Agriculture. | - Internal Member |
| 6. Mr. K K Bhati, Associate Professor, Agriculture | - Internal Member |
| 7. Dr. Neelu Jain, Associate Professor, Agriculture. | - Internal Member |
| 8. Mr. Piyush Sharma, MPUAT, Udaipur | - Alumni |
| 9. Mr. Gautam Singh Dhaked, Head, Agriculture. | - Convener |

At the outset, Mr. Gautam Singh Dhaked, Head of the Department of Agriculture, warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

Agenda 1: To approve minutes of the previous BOS, held on 14-06-2019

Resolution: Minutes of the previous BOS of the Agriculture Department held on 14-06-2019 were discussed and approved.

Agenda 2: Propose to review the present course structure and syllabus for UG and PG.

Resolution: The faculty of Agriculture reviewed the present courses of Agriculture respective disciplines in line with the Fifth Dean's committee recommendations of the Indian Council of Agriculture Research (ICAR), New Delhi.

Agenda 3: To recommend the approved syllabus to Academic Council.

Resolution: After the approval and discussions during the Board of Studies, the courses. Would be put up before Academic Council, to be held shortly.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.

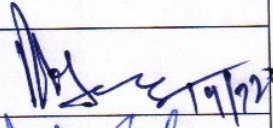
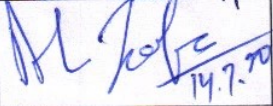
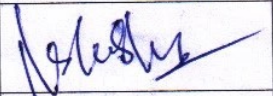
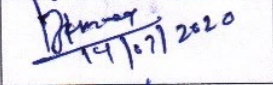
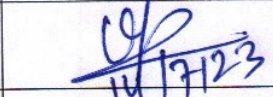
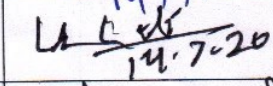
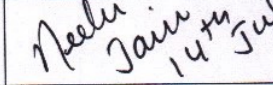
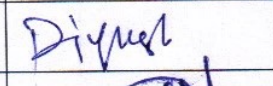



MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF AGRICULTURE

14.07.2020

Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Prof. (Dr.) Arvind Rajpurohit, Dean, Agriculture	Chairman	 19/7/20
2	Prof. (Dr.) A. L. Tapadiya, Rtd. Professor, RCA Udaipur	External Member	 14.7.20
3	Prof. (Dr.) M.S. Shaktawat Rtd. Professor, RCA Udaipur	External Member	
4	Mr. Brjesh Kumar Meena, Assistant Professor, Agriculture	Internal Member	 14/7/2020
5	Mr. Omprakash Regar, Assistant Professor, Agriculture	Internal Member	 14/7/20
6	Mr. K K Bhati, Associate Professor	Internal Member	 14.7.20
7	Dr. Neelu Jain, Assistant Professor, Agriculture	Internal Member	 14 th July 2020
8	Mr. Piyush Sharma	Alumni	
9	Mr. Gautam Singh Dhaked, Head, Agriculture	Convener	 14/7/20
		Special Invitee (if any)	

OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.:MU/RO/2020/ 502-A

27th May 2020

OFFICE ORDER

Sub.: Reconstitution of Board of Studies for Department of Life Science

The Board of Studies for the Department of Life Science reconstituted as per Rule 7 of the Statutes of Mewar University, as under:

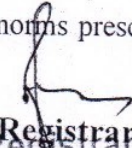
- | | |
|---|-------------------|
| 1. Mr. D. K. Sharma, Dean Academics, | - Chairman |
| 2. Prof. (Dr.) B.L. Yadav, Retd. Professor, Dept. of Botany, MLV Govt. College Bhilwara | - External Member |
| 3. Prof. (Dr.) C.K. Sharma, Retd. Professor, Dept. of Zoology, MLV Govt. College Bhilwara | - External Member |
| 4. Dr. Satish Kumar Ameta, Assistant Professor, Environmental Science. | - Internal Member |
| 5. Dr. Ankita Mathur, Assistant Professor, Microbiology | - Internal Member |
| 6. Nitesh Kumar Malvi | - Alumni |
| 7. Dr. Vipin Yadav, Head & Assistant Professor | - Convener |

The terms of reference for the Board of Studies are as provided in Rule 7 of the Statutes.

The Chairman of the Board of Studies may associate any member in the meeting, as a special invitee if it is considered his association will contribute to the task of the meeting with the approval of the President/Vice-Chancellor.

The Convener of the Meeting is advised to hold the meeting of the BOS seeking the convenience of the Chairman in the third week of June 2020. The proceedings of the meeting may be sent to the VC/Registrar as early as possible.

The External Members shall be entitled to TA/DA and sitting fees as per the norms prescribed by the Mewar University.


Registrar
Mewar University
Gangrar, (Chittorgarh)

Copy to:

- PS to Hon'ble Chairperson (for kind information)
- PS to Hon'ble President (for kind information)
- PS to Hon'ble Pro-President (for kind information)
- All concerned Deans/Directors/HoD's (for kind information & necessary action)
- Accounts/Examination/Library/Store/Warden/Security/IT Head.
- Coordinator, IQAC Cell.
- Record file.

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

DEPARTMENT OF LIFE SCIENCE

DATE: 19.06.2020

Minutes of Meeting of Board of Studies

Minutes of the BOS of the Department of Life Science meeting held on 19-06-2020 at 11.30 AM.

The following members were present: (Annexure 1)

1. Mr. D. K. Sharma, Dean Academics - Chairman
2. Prof. (Dr.) B.L. Yadav, Retd. Professor, Dept. of Botany, MLV Govt. College Bhilwara - External Member
3. Prof. (Dr.) C.K. Sharma, Retd. Professor, Dept. of Zoology, MLV Govt. College Bhilwara - External Member
4. Dr. Satish Kumar Ameta, Assistant Professor, Environmental Science. - Internal Member
5. Dr. Ankita Mathur, Assistant Professor, Microbiology - Internal Member
6. Nitesh Kumar Malvi - Alumni
7. Dr. Vipin Yadav, Head & Assistant Professor - Convener

At the outset, Dr. Vipin Yadav, Head of the Department of Life Science, warmly welcomed all the board members. The Head also appreciated the presence of outside experts who took the pain and keen interest to attend this meeting.

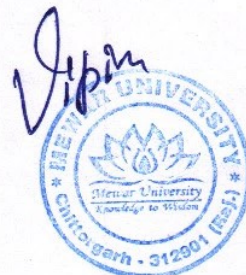
Agenda 1: To approve minutes of the previous BOS, held on 13-06-2019

Resolution: Minutes of the previous BOS of the Life Science Department held on 13-06-2019 were discussed and approved.

Agenda 2: Brief presentation of academic activities of the department before the BOS Committee by the convener

Resolution: Dr. Vipin Yadav, (Head of the Life Science Department) presented a departmental activity report mentioning all the activities conducted related to curricular development, research and development, and faculty development.

Agenda 3: To approve the syllabus of new courses of M.Sc (Botany, Zoology, Microbiology, Biotechnology, Environmental Science) for semesters IIIrd and IVth



Resolution: As per the feedback received from the BOS members department introduce new courses in the following P.G. programs. (**Annexure 2**)

- **M.Sc Botany**

M.Sc Botany course adds five new Discipline Specific Elective courses in IIIrd Semester are mentioned below:-

1. Applied Plant Sciences
2. Tissue Culture, Production, and Utilization of Transgenic Plants
3. Techniques in Plant Biotechnology & IPR
4. Metabolism and Plant Growth Regulators
5. Microbes and Microbial Technology

- **M.Sc Zoology**

M.Sc Zoology course adds one new Discipline Specific Elective paper mentioned below:

1. Wildlife Biology- Biodiversity and Wildlife Ecology in IVth Sem.

- **M.Sc Environmental Science**

M.Sc Environmental Science courses add five new Discipline Specific Elective papers mentioned below:

1. Remote Sensing and GIS in Environmental Science in IVth Sem.
2. Meteorology in IVth Sem.
3. IPR in IVth Sem.
4. Systematics and biogeography
5. Natural Hazards and Disaster Management

- **M.Sc Microbiology**

M.Sc Microbiology course also adds two Discipline Specific Elective papers that are

1. Microbial Ecology in IIIrd Sem
2. Advances in Microbiology” in IVth Sem
3. Medical Biotechnology and Gene Therapy
4. Eukaryotic Microbiology
5. Diversity of Life Forms and Environmental Application

- **M.Sc Biotechnology**

M.Sc Biotechnology course also adds two Discipline Specific Elective papers that are



1. Biosafety, Bioethics and IPR” in IIIrd Sem
2. Medical and Pharmaceutical Biotechnology” in IVth Sem
3. Cancer Biology


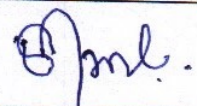
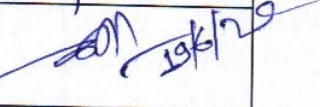
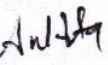
Agenda 4: To recommend the approved syllabus to Academic Council.

Resolution: Members of the Board of Studies approved the revised syllabus and recommended the same be forwarded to the Academic Council for their approval.

The meeting was dissolved with thanks to the Chair and all the Board of Studies Members.



Annexure 1: Attendance Sheet

S.NO.	Name & Designation	Designation in BOS	Signature
1	Dean, Faculty of Science & Technology	Chairman	 19/6/20
2	Dr. B.L. Yadav, Retd. Professor, Dept. of Botany, MLV Govt. College Bhilwara, MDSU Ajmer	External Member	
3	Dr. C.K. Sharma, Retd. Professor, Dept. of Zoology, MLV Govt. College Bhilwara, MDSU Ajmer	External Member	 19/6/20
4	Dr. Satish Kumar Ameta, assistant Professor	Internal Member	Satish 19/6
5	Dr. ankita Mathur, Assistant Professor	Internal Member	
6	Nitesh Kumar Malvi	Alumni	nitesh
7	Dr. Vipin Yadav, Assistant Professor	Convener	vipin

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Department of Life Science

M.SC BOTANY

APPLIED PLANT SCIENCES

Unit-I

Biofertilizers: General account of the microbes used as biofertilizers - *Rhizobium*, *Azospirillum*, *Azotobacter*, Cyanobacteria (blue-green algae), *Azolla* and *Anabaena azollae* association, Mycorrhizal association; colonization of VAM. Organic farming - Green manuring and organic fertilizers.

Unit-II

Nursery development: objectives and scope. Planning and seasonal activities - Planting - direct seeding and transplants. Vegetative propagation: air-layering, cutting, treatment of cutting, rooting medium and planting of cuttings.

Unit-III

Floriculture:

Importance and scope of floriculture and landscape gardening. Ornamental Plants: Flowering annuals; Herbaceous perennials. Bonsai. Commercial Floriculture: Factors affecting flower production. Hardening of plants - greenhouse - mist chamber, shed root, shade house and glass house.

Unit-IV

Plant disease management:

Symptoms of plant diseases. Control methods. Integrated pest management. Study of etiology and management of the following important plant diseases; Downy mildew and Green ear of bajra, Blight of maize, Tikka disease of groundnut, Leaf blight of rice, Grassy shoots of sugarcane, Sandal spike, Rice tungro, Bunchy top of the banana. Diseases and Pests of Ornamental Plants.

Unit-V

Intellectual Property Rights: Introduction to Intellectual Property. Historical Perspective, Different Types of IP, Importance of protecting IP. Copyrights, Trade Marks, Patents, Geographical Indications, Trade Secrets, Different International agreements; World Trade Organization (WTO), General Agreement on Tariffs & Trade (GATT), Trade Related Intellectual Property Rights (TRIPS).

Practicals:

1. Effect of mycorrhizal inoculation on plant growth.
2. Study of root nodule development
3. Effect of Blue Green algae on plant growth
4. Various nursery and gardening practices
5. IPR issues-case studies
6. Study of important plant diseases

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Reference Books

1. Vayas,S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic Farming Akta Prakashan, Nadiad
2. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
3. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
4. N.K. Acharya: *Textbook on intellectual property rights*, Asia Law House (2001).
5. Manjula Guru & M.B. Rao, *Understanding Trips: Managing Knowledge in Developing Countries*, Sage Publications (2003).
6. P. Ganguli, Intellectual Property



Department of Life Science

TISSUE CULTURE, PRODUCTION AND UTILIZATION OF TRANSGENIC PLANTS

Objectives:

1. To study about the basic process and requirements of Plant Tissue culture.
2. To learn about the culture of different types of tissues and cells and their application
3. To learn about Agrobacterium-mediated, direct and indirect gene transfer in plants
4. To learn the techniques for developing transgenic plants and their application in crop improvement
5. To study about Metabolic engineering for metabolites and industrial products

Outcomes:

On completion of the course, the students shall

1. Know methods of plant tissue culture, organogenesis and somatic embryogenesis and their application in crop improvement.
2. Be able to understand the process of protoplast isolation, fusion and culture, selection of hybrid cells and regeneration of hybrid plants
3. Learn the method of gene transfer for developing transgenic plants
4. Gain knowledge on transgenics for herbicide resistance, resistance to biotic stress abiotic stress and other quality improvement
5. Gain knowledge on metabolic engineering for augmentation of secondary metabolite biosynthesis and their industrial potential.

UNIT -I

Plant tissue culture: Major pathways of plant tissue culture and their application: meristem culture, organogenesis and somatic embryogenesis, *Ex vitro* rooting, plant acclimatization

Applications: embryo culture and embryo rescue, anther and microspore culture for production of haploids and development of homozygous lines, production of somaclonal variants, cell suspension culture for secondary metabolite production, cryopreservation and slow growth for germplasm conservation.

UNIT -II

Vector-mediated Gene Transfer to plants: features of Ti and Ri plasmids, molecular mechanism of T-DNA transfer, role of virulence genes, binary and co-integrate vectors, protocol for *Agrobacterium*-mediated genetic transformation. Hairy root cultures as source of pharmaceuticals.

Vectorless / direct gene transfer to plants: Physical methods (particle bombardment, electroporation, microinjection, liposome mediated, silicon carbide fibers), chemical methods (PEG - mediated, calcium phosphate co-precipitation), precision of transgene integration by site-specific recombination.

UNIT -III

Selection & analysis of transgenic lines and progenies: Promoters and terminators, selectable markers

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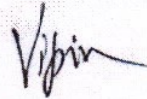
and reporter genes, detection of transgene and products, enzyme activity assay (GUS, NPT), transgene stability, Production of marker free transgenic plants.

Transgenic manipulations for crop improvement: Herbicide resistance (phosphinothricin, glyphosate), resistance to biotic stress (insects & fungal pathogens), quality improvement (vitaminA in cereals, longer post-harvest life of flowers and fruits). Molecular farming: Carbohydrates (case study-starch), proteins (Hirudin production in *Brassica napus*).

UNIT -IV

Chloroplast Engineering: Chloroplast genome, chloroplast transformation: rationale, methods used for generation of homoplasmic transplastomic plants, vectors for chloroplast transformation, transplastomics without antibiotic resistant gene, applications of chloroplast transformation. Biosafety regulations and commercialization.

Antisense RNA technology: Regulatory RNA (micro RNA), Antisense RNA, construction of antisense vectors, analysis of antisense clones, applications of antisense technology. Gene silencing: causes (DNA methylation, homology-dependent suppression by antisense gene), CRISPAR-Cas9, strategies for avoiding gene silencing and it's application.



MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Department of Life Science

TECHNIQUES IN PLANT BIOTECHNOLOGY & IPR

Objectives:

1. To study about the scope of recombinant DNA technology and learn the basic processes.
2. To learn the principle and mechanism of action of plasmid, DNA isolation and purification and amplification
3. To study the modern methods in plant biotechnology.
4. To understand the Protein engineering
5. To learn modern methods of molecular analysis
6. To understand the Processing of recombinant proteins.
7. To understand the Intellectual property rights (IPR) and Plant genetic resources

Outcomes:

On completion of the courses the students shall

1. Have knowledge in the Recombinant DNA technology and Genetic Engineering.
2. Understand the mechanism of action of different vectors used in genetic engineering.
3. Have knowledge the principle and application of PCR, and other equipment in genetic engineering.
4. Gain knowledge about basics and application of genetic engineering.
5. Be able to use SDS-PAGE, 2-D Gel electrophoresis, mass spectrometry (MALDI-TOF), NMR, and X-ray crystallography
6. Understanding the scope and application of Protein engineering.
7. Learn about the plant genetic resources and their proper protection and management.

UNIT -I

Techniques in Molecular Biology: Recombinant DNA technology; Genomic DNA & plasmid DNA isolation and purification, Vectors - plasmids, phages, cosmids, shuttle vectors, artificial chromosomes, plant viruses and other advanced vectors, construction of recombinant DNA and plant expression cassettes, Transformation selection and analysis of recombinant clones, Chromosome walking, genomic DNA and cDNA libraries. Maps using YACs, BACs and *in situ* hybridization. Gene tagging: Transposable genetic elements in bacteria, IS elements, composite transposon, Class I & II transposable elements in eukaryotes, T-DNA tagging. Concept and features of DNA microarray.

UNIT-II

Processing of the recombinant proteins: Purification and refolding; characterization, stabilization. Analysis of proteins: SDS-PAGE, 2-D Gel electrophoresis, mass spectrometry (MALDI-TOF), NMR, X-ray crystallography, Mutagenesis: tools for protein engineering; site saturated and site-directed mutagenesis. Proteomics: Resolution & characterization of

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recombinant proteins, post-translational modifications, protein chips, protein- protein interactions.

UNIT -III

Protein and nucleic acid databases (PDB, Swiss Port, BRENDA, NCBI and PlantGDb).

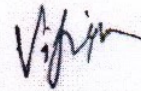
Sequence annotation and biological data mining, concept of phylogenetics Protein-protein interaction databases (Types, methods and applications)

Structure and Function analysis of Proteins/Enzymes (Rubisco, Carbonic Anhydrase) Protein visualization tools and its application

UNIT -IV

DNA-based markers: Molecular markers based on DNA restriction-hybridization (RFLP), PCR (RAPD, SSR, ISSR, SNP) and combination approach (AFLP), characterization of genetic diversity and phylogenetic relationship, marker assisted selection for plant breeding.

Intellectual Property Rights (IPRs) and Patents: IPRs, classification, rationale for protection of IPRs, patents-concept and patenting of biological material, Farmer's and breeders right's, plant varietal protection and farmer's right act.



Department of Life Science

METABOLISM AND PLANT GROWTH REGULATORS

UNIT-I

Nucleotide biosynthesis: De-novo synthesis of purine and pyrimidine, Salvage pathway, Synthesis of deoxy-nucleotides. Synthesis of nucleotide triphosphates.

Degradation of nucleotides: catabolism of purines and pyrimidines.

Regulation of nucleotide biosynthesis and chemotherapeutic targeting.

Plant Transcriptional factors (functional domains and regulation) and their importance in plant development

UNIT-II

Carbohydrate metabolism in plants: Introduction and general overview

Sucrose metabolism pathway: synthesis, regulation and breakdown in plants. Sucrose-starch conversion

Starch structure and metabolism

Cellulose synthesis, Cellulose Synthase Complex in plants-structure and function

Carbon concentration mechanism in plants

UNIT-III

Secondary metabolite synthesis pathways in plants: importance and function

Alkaloids, Folates, Tannin and Lignin biosynthesis pathway. Defensive resins synthesis in conifers.

Biosynthetic pathways of important medicinal compounds (Taxol, artemisinin)

Metabolite analysis: Extraction, Separation and Purification methods

UNIT-IV

Plant grown regulators: Synthesis and physiology of auxin, gibberellins, cytokinins, Ethelene and ABA.

Concept of hormonal receptors, Auxin transporters. Biochemistry of seed germination. Application of growth regulators in agriculture and horticulture

Vijai

MICROBES AND MICROBIAL TECHNOLOGY

UNIT I

General Microbiology: Diversity of the microbial world – Microbial taxonomy and phylogeny; Microbial nutrition, growth and metabolism; Genetics of bacteria and their viruses.

UNIT II

Agricultural Microbiology: Agriculturally important microorganisms; Biological nitrogen fixation; Mycorrhizae, microbial mineralization, Biocontrol of plant diseases, Plant growth promoting rhizobacteria (PGPR).

UNIT III

Environmental Microbiology: Microbes and quality of environment; Distribution and implications of microbes in air – bio-aerosols, microbial flora of water, water pollution, drinking water and domestic waste treatment systems; Microbial pesticides, Biotransformation's: microbial degradation of pesticides and toxic chemicals, biodegradation of the agricultural residues, bioremediation of contaminated soils and water. Microbes in nanotechnology, biosensors; Microbes in extreme environments.

UNIT IV

Food and Industrial Microbiology: Recent developments in food and industrial microbiology – Fermentation, fermented foods, fermenter design and growth processes, food spoilage, methods of food preservation;

UNIT V

Microbes in recovery of metal (bioleaching) and oil, Recombinant-DNA technology; Cell and enzyme immobilization, microbial enzymes of industrial interest; Novel medicines from microbes.

SUGGESTED READINGS:

1. Prescott L, Harley J, Klein D (2005) Microbiology, 6th edition, Mc Graw-Hill.
2. Singh VP and Stapleton RD (Eds.) (2002) Biotransformations: Bioremediation Technology for Health and Environmental Protection. "Progress in Industrial Microbiology Vol. 36", Elsevier Science.
3. Subba Rao NS (1982) Advances in Agriculture Microbiology, Butterworth-Heinemann.



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4. Subba Rao NS and Dommergues YR (Eds.) (2001) Microbial Interactions in Agriculture and Forestry Vol. 2, Science Pub. Inc.
5. Waite MJ, Morgan NL, Rockey JS, Higton G (2001) Industrial Microbiology: An Introduction, Wiley-Blackwell.



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Wildlife Biology- Biodiversity and Wildlife Ecology

UNIT I

Understand the concept of biodiversity and its significance in wildlife conservation.

Explore the principles of wildlife ecology and the factors influencing population dynamics.

UNIT II

Learn methods for studying wildlife populations, including survey techniques and data analysis.

Examine the relationship between wildlife and their habitats, including habitat selection and habitat management.

UNIT III

Gain knowledge of conservation strategies and approaches to mitigate threats to wildlife populations. Develop critical thinking and problem-solving skills through hands-on fieldwork and case studies.

UNIT IV

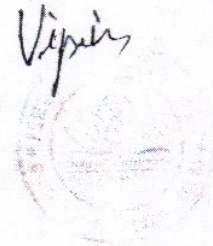
Introduction to Wildlife Biology, Definition and scope of wildlife biology, Importance of biodiversity in wildlife conservation

UNIT V

Species Diversity and Classification, Taxonomy and classification of wildlife, Measures of species diversity

Suggested reading

"Wildlife Ecology and Management" by Eric G. Bolen and William L. Robinson



MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
Department of Life Science

M.Sc. Environmental Science
REMOTE SENSING AND GIS IN ENVIRONMENTAL SCIENCE

UNIT-1

Principles of Remote Sensing, History, Stages of Remote Sensing, Remote Sensing In India, Types of Remote Sensing and Types of Resolution: Spectral, Spatial, Temporal, Radiometric, Spectral Signatures. Electro Magnetic Radiation, EM Spectrum, Energy Interaction with the Atmosphere and Earth's Surface.

UNIT-2

Types of platforms, Types of sensors and cameras, processes of sensor & its characteristics. Element of Image Interpretation: Tone, Color, Texture, Pattern, Shape, Size and associated features

UNIT-3

Definition, History, Objectives of GIS, components of GIS, Application of GIS

UNIT-4

Types of Geographical Data: Raster Data Model, Vector Data Model. GIS Tasks: Input, Manipulation, Management, Query, Analysis and Visualization. Layer, Geographic Reference

UNIT-5

Types of data: Spatial Data, Non-Spatial Data, Level of measurement: Nominal, Ordinal, Interval, Ratio. Definition, Advantages of Topology, Concept of Arc, Node and Vertices, Connectivity, Containment, Contiguity

Recommended Books:

1. Fundamentals of Remote Sensing: George Joseph
2. Remote Sensing and Image Interpretation: Lillesand & Keifer
3. Remote Sensing Principles and Interpretation: F.F. Sabins
4. Introduction to Remote Sensing: J.B. Campbell

Remote Sensing and GIS in Environmental Science Practical:

1. Map composition
2. Use of model maker for band rationing
3. Data import and export
4. Geometric correction and mosaicing of image
5. Pattern analysis, measures of arrangement & dispersion autocorrelation, semivariogram analysis



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MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
Department of Life Science

M.Sc. ENVIRONMENTAL SCIENCE
METEOROLOGY

UNIT-1

Basic concepts, scope and importance of Meteorology, Concept of weather and climate. Atmospheric composition, the structure of the atmosphere, atmospheric stability, Koeppen's scheme of classification of climate, types of precipitation (rainfall, hailstorm, etc.)

UNIT-2

Meteorological parameters eg. Rainfall, pressure, wind speed, humidity, temperature, sunshine, etc. types of clouds and their formation, Atmospheric circulation, Inter Tropical Convergence Zone (ITCZ), Energy transfer within the earth-atmosphere system

UNIT-3

Heating Earth's Surface and Atmosphere, Tropical and polar climate, The South Asian monsoon, Winter, Spring, Early Summer, Summer, and Autumn. Indian Monsoon, Optical Phenomena of the Atmosphere

UNIT-4

Atmospheric radiation, meteorological disasters (cyclones, tornados, hurricanes), Lightening, dust storms, Remote sensing in climatic studies

UNIT-5

Greenhouse gas effect, global warming, climate change, natural causes of climate change, human impact on climate change, ozone hole formation

Recommended Books:

1. The atmosphere: an introduction to meteorology by Lutgens & Tarbuck.
2. Atmosphere, Weather and Climate by Roger G. Barry and Richard J. Chorley
3. An Introduction to Physical Geography and the Environment by Joseph Holden

Meteorology Practical:

1. Measurement of maximum, minimum temperatures and soil temperature
2. Measurement of rainfall and evaporation measuring instruments
3. Analysis of rainfall data for climatological studies
4. Estimation of Potential Evapotranspiration
5. Measurement of atmospheric pressure and analysis of atmospheric conditions



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MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
Department of Life Science

M.SC ENVIRONMENTAL SCIENCE
IPR

UNIT I

Introduction to ethics and bioethics: Personal ethics: profession and professionalism - Moral Reasoning - Ethical theories - person as an experimenter - Moral leadership (integrity and ingenuity) - the framework for ethical decision making.

UNIT II

Biotechnology and ethics: Biotechnology in agriculture and environment: benefits and risks - benefits and risks of genetic engineering - ethical aspects of genetic testing - ethical aspects relating to the use of genetic information - genetic engineering and biowarfare.

UNIT III

Ethical implications of cloning: Reproductive cloning, therapeutic cloning; Ethical, legal and socio-economic aspects of gene therapy, germ line, somatic, embryonic and adult stem cell research- GM crops and GMOs - biotechnology and biopiracy - ELSI of the human genome project.

UNIT IV

Introduction to biosafety: Biosafety issues in biotechnology - risk assessment and risk management - safety protocols: risk groups - biosafety levels - biosafety guidelines and regulations (National and International), types of biosafety containment. Ethical issues for animal cell culture.

UNIT V

Introduction to intellectual property and intellectual property rights: Types, patents, copyrights, trade secrets and trademarks, design rights, geographical indications - the importance of IPR - patentable and nonpatentable - patenting life - legal protection of biotechnological inventions - world intellectual property rights organization (WIPO)

Suggested Readings

1. Ethics in engineering, Martin. M.W. and Schinzinger.R. III Edition, Tata McGraw-Hill, New Delhi. 2003.
2. Thomas, J. A. and Fuch, R. L. Biotechnology and Safety Assessment. Academic Press. (2002).
3. Fleming, D. A., Hunt, D. L., Biological Safety Principles and Practices. ASM Press. (2000).
4. Sateesh, M. K. Bioethics & Biosafety, IK Publishers. (2008).
5. Singh B. D. Biotechnology: Expanding Horizon. Kalyani; edition (2015)
6. Singh K., Intellectual Property Rights on Biotechnology BCIL, New Delhi. (2008).
7. Desai, V., Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House (2007).
8. Singh, I. and Kaur, B., Patent law and Entrepreneurship, Kalyani Publishers (2006).
9. Goel and Prashar, IPR, Biosafety and Bioethics, Pearson Education, India (2013)

V. Singh

DEPARTMENT OF LIFE SCIENCE

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH
DEPARTMENT OF LIFE SCIENCE

SYSTEMATICS AND BIOGEOGRAPHY

Introduction: This course will discuss principles and applications of classical and modern day systematic to classification of living organisms, develop understanding of historical and contemporary patterns of distributions of organisms, and design effective conservation strategies using biogeographic theories in an era of global change and large scale human induced degradation.

UNIT 1: Concept and systematic approaches

Concept of taxa (species, genus, family, order, class, phylum, kingdom); concept of species (taxonomic, typological, biological, evolutionary, phylogenetic); categories and taxonomic hierarchy.

Definition of systematic; taxonomic identification; keys; field inventory; herbarium; museum; botanical gardens; taxonomic literature; nomenclature; evidence from anatomy, palynology, ultrastructure, cytology, phyto-chemistry, numerical and molecular methods; taxonomy databases.

UNIT 2: Taxonomic hierarchy, Nomenclature & Systems of classification

Principles and rules (International Code of Botanical and Zoological Nomenclature); ranks and names; types and typification; author citation; valid publication; rejection of names; principle of priority and its limitations; names of hybrids; classification systems of Bentham and Hooker; Angiosperm Phylogeny Group (APG III) classification. Operational Taxonomic Units; DNA barcoding; phylogenetic tree (rooted, unrooted, ultrametric trees).

UNIT 3: Biogeography, Speciation and extinction

Genes as unit of evolutionary change; mutation; genetic drift; gene flow; natural selection; geographic and ecological variation; biogeographical rules – Gloger's rule, Bergmann's rule, Allen's rule, Geist rule; biogeographical realms and their fauna; endemic, rare, exotic, and cosmopolitan species.

Types and processes of speciation – allopatric, parapatric, sympatric; ecological diversification; adaptive radiation, convergent and parallel evolution; dispersal and immigration; means of dispersal and barriers to dispersal; extinction.

UNIT 4: Historical, ecological & conservation biogeography

Paleo-records of diversity and diversification; role in biogeographic patterns – past and present; biogeographical dynamics of climate change and Ice Age. Species' habitats; environment and niche concepts; biotic and abiotic determinants of communities; species-area relationships; concept of rarity and commonness; Island Biogeography theory; Equilibrium Theory of Island Biogeography. Application of biogeographical rules in design of protected area and biosphere reserves.

Practicals: Based on the theory.

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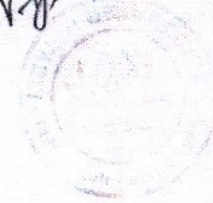
Text Books:

- Mani, M.S. 1974. *Ecology and Biogeography in India*. Dr. W Junk Publishers., The Hague.
- Williams, D. M., Ebach, M.C. 2008. *Foundations of Systematics and Biogeography*. Springer.

Reference Books:

- Lomolino, M.V., Riddle, B.R., Whittaker, R.J. & Brown, J.H. 2010. *Biogeography* (4th edition). Sinauer Associates, Sunderland.
- Singh, G. 2012. *Plant Systematics: Theory and Practice* (3rd edition). Oxford & IBH Pvt. Ltd., New Delhi.
- Wheeler, Q.D. & Meier R. 2000. *Species Concepts and Phylogenetic Theory: A Debate*. Columbia University Press, New York.
- Wilkins, J. S. 2009. *Species: A History of the Idea* (Vol. 1). University of California Press.

Vijay



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DEPARTMENT OF LIFE SCIENCE

NATURAL HAZARDS AND DISASTER MANAGEMENT

Introduction: This paper introduces the students to various aspects of environmental hazards, their causes, classifications, and impacts. It also focuses on the management strategies and governmental action plan to mitigate and prepare for such hazards.

UNIT 1: Natural hazards

Hydrological, atmospheric & geological hazards; earthquake: seismic waves, epicenter; volcanoes: causes of volcanism, geographic distribution; floods: types and nature, frequency of flooding; landslides: causes and types of landslides, landslide analysis; drought: types of drought - meteorological, agricultural, hydrological, and famine; Glacial Lake Outburst Floods (GLOF); tornadoes, cyclone & hurricanes; tsunamis: causes and location of tsunamis; coastal erosion, sea level changes and its impact on coastal areas and coastal zone management.

UNIT 2: Anthropogenic hazards

Impacts of anthropogenic activities such as rapid urbanization, injudicious ground water extraction, sand mining from river bank, deforestation, mangroves destruction; role of construction along river banks in elevating flood hazard; disturbing flood plains, deforestation and landslide hazards associated with it; large scale developmental projects, like dams and nuclear reactors in hazard prone zones; nature and impact of accidents, wildfires and biophysical hazards. Case studies of Bhopal, Minamata and Chernobyl disaster.

UNIT 3: Risk and vulnerability assessment

Concept of risk and vulnerability; two components of risk: likelihood and consequences, qualitative likelihood measurement index; categories of consequences (direct losses, indirect losses, tangible losses, and intangible losses); application of geoinformatics in hazard, risk & vulnerability assessment. Concept of mitigation; types of mitigation: use of technologies in mitigations such as barrier, deflection and retention systems; importance of planning, exercise, and training in preparedness; role of public and media in hazard preparedness.

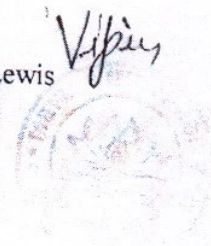
UNIT 4: Disaster management in India

Lessons from the past considering the examples of Bhuj earthquake, tsunami disaster, and Bhopal tragedy; National Disaster Management Framework, national response mechanism, role of government bodies such as NDMC and IMD; role of armed forces and media in disaster management; role of space technology in disaster management; case study of efficient disaster management during cyclone 'Phailin' in 2013.

Practicals: Based on the theory.

Text Books:

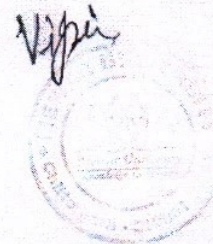
- Schneid, T.D. & Collins, L. 2001. *Disaster Management and Preparedness*. Lewis Publishers, New York, NY.



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Reference Books:

- Coppola D. P. 2007. *Introduction to International Disaster Management*. Butterworth Heinemann.
- Cutter, S.L. 2012. *Hazards Vulnerability and Environmental Justice*. EarthScan, Routledge Press.
- Keller, E. A. 1996. *Introduction to Environmental Geology*. Prentice Hall, Upper Saddle River, New Jersey.
- Pine, J.C. 2009. *Natural Hazards Analysis: Reducing the Impact of Disasters*. CRC Press, Taylor and Francis Group.



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Department of Life Science

M.SC MICROBIOLOGY
MICROBIAL ECOLOGY

Unit - I

Soil microbiology: Soil as a habitat for organisms and their reactions, soil texture and properties, distribution of microorganisms in soil and its significance, microbial density in soil- zymogenous and autochthonous flora in soil. Interaction between microbes and plants: rhizosphere and rhizoplane microbes, R:S ratio, phyllosphere, phyllosphere microorganisms, their importance in plant growth. Interaction among microorganisms: mutualisms, commensalism, competition, amensalism, parasitism and predation.

Unit - II

Air microbiology: microbial population and its significance. Aerosol, droplet nuclei, air pollution- sources (Microbiological) - air quality analysis- air sampling devices. Isolation, enumeration and methods of studying. Water microbiology: microbial population and its significance, Isolation and enumeration. Methods of studying water microbiology. Eutrophication, algal blooms and red tides. Definition, causes, effects, Water treatment Primary, secondary and tertiary. Drinking water- Potability- MPN technique. Marine Microbiology: biodiversity resources, Microbial corrosion, Deep sea microbiology and Geothermal Events.

Unit - III

Microbes in extreme environments: Habitat, biodiversity, metabolic characteristics, physiological adaptations, evolutionary, ecological, commercial and biotechnological significance. Thermophiles; Classification and properties. Hyperthermophiles and extreme thermophilic habitats. Alkaline environment and Alkalophiles: Classification and properties, Soda lakes and deserts, calcium alkalophily. Acidophiles: Classification, life at low pH, acidotolerance, applications.

Unit - IV


Halophiles: Classification and properties, Evolutionary, ecological and commercial significance, Dead Sea, discovery basin, cell walls and membranes - Purple membrane, compatible solutes. Osmoadaptation / halotolerance. Applications of halophiles and their extremozymes. Barophiles: Classification and properties, Evolutionary, ecological and commercial significance, high-pressure habitats, life under pressure, death under pressure.

Unit V

Psychrophiles and psychrotrophs: Classification and properties, Evolutionary, ecological and commercial significance, Role of microorganisms in the biogeochemical cycling of carbon, nitrogen, phosphorus, sulphur, iron, manganese, silicon etc.). nitrogen fixing microorganisms root nodule bacteria - non symbiotic Nitrogen fixers- Rhizobium and phosphate solubilisers. Methanogens, Methylophiles. Microbial Biofilms: Nature, properties and significance, Mechanism of microbial adherence.

Suggested Readings

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Suggested Readings

1. Atlas RM and Bartha R. (2000). Microbial Ecology: Fundamentals & Applications. 4th edition. Benjamin/Cummings Science Publishing, USA.
2. Atlas RM. (1989). Microbiology: Fundamentals and Applications. 2nd Edition, MacMillan Publishing Company, New York.
3. Madigan MT, Martinko JM and Parker J. (2009). Brock Biology of Microorganisms. 12th edition Pearson/ Benjamin Cummings.
4. Campbell RE. (1983). Microbial Ecology. Blackwell Scientific Publication, Oxford, England.
5. Coyne MS. (2001). Soil Microbiology: An Exploratory Approach. Delmar Thomson Learning.
6. Lynch JM & Hobbie JE. (1988). Microorganisms in Action: Concepts & Application in Microbial Ecology. Blackwell Scientific Publication, U.K.
7. Maier RM, Pepper IL and Gerba CP. (2009). Environmental Microbiology. 2nd edition, Academic Press.

Vijai

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Department of Life Science

M.SC MICROBIOLOGY

ADVANCES IN MICROBIOLOGY

Unit I

Evolution of Microbial Genomes

Salient features of sequenced microbial genomes, core genome pool, flexible genome pool and concept of pangenome, Horizontal gene transfer (HGT), Evolution of bacterial virulence Genomic islands, Pathogenicity islands (PAI) and their characteristics

Unit II

Metagenomics

Brief history and development of metagenomics, Understanding bacterial diversity using metagenomics approach, Prospecting genes of biotechnological importance using metagenomics Basic knowledge of viral metagenome, metatranscriptomics, metaproteomics and metabolomics.

Unit III

Molecular Basis of Host-Microbe Interactions

Epiphytic fitness and its mechanism in plant pathogens, Hypersensitive response (HR) to plant pathogens and its mechanism, Type three secretion systems (TTSS) of plant and animal pathogens.

Unit IV

Biofilms

Biofilms: types of microorganisms, molecular aspects and significance in the environment, health care, virulence and antimicrobial resistance

Unit V

Systems and Synthetic Biology

Networking in biological systems, Quorum sensing in bacteria, Co-ordinated regulation of bacterial virulence factors, Basics of synthesis of poliovirus in the laboratory, Future implications of synthetic biology for bacteria and viruses

SUGGESTED READING

1. Fraser CM, Read TD and Nelson KE. Microbial Genomes, 2004, Humana Press
2. Miller RV and Day MJ. Microbial Evolution- Gene establishment, survival and exchange, 2004, ASM Press
3. Bull AT. Microbial Diversity and Bioprospecting, 2004, ASM Press
4. Sangdun C. Introduction to Systems Biology, 2007, Humana Press
5. Klipp E, Liebermeister W. Systems Biology - A Textbook, 2009, Wiley -VCH Verlag
6. Caetano-Anolles G. Evolutionary Genomics and Systems Biology, 2010, John Wiley and Sons
7. Madigan MT, Martin JM, Dunlap PV and Clark DP (2014) Brook's Biology of Microorganisms, 14th edition, Pearson-Benjamin Cummings
8. Wilson BA, Salyers AA Whitt DD and Winkler ME (2011) Bacterial Pathogenesis- A Molecular Approach, 3rd edition, ASM Press,



V. J. Singh

DEPARTMENT OF LIFE SCIENCE

**MEWAR UNIVERSITY, GANGRAR, CHITTORGARH
DEPARTMENT OF LIFE SCIENCE**

MEDICAL BIOTECHNOLOGY AND GENE THERAPY

UNIT I

Disease diagnosis-probe, PCR, LCR immunological assay. Detection of genetic, Neurogenetic disorders involving Metabolic and Movement disorders. Treatment-products from recombinant and non-recombinant organisms, Interferons, Antisense therapy, cell penetrating peptides. Gene therapy, Types of gene therapy, somatic virus germline gene therapy, mechanism of gene therapy, Immunotherapy.

UNIT II

Detection of mutations in neoplastic diseases MCC, SSCP, DGGE, PTTC. Focusing on emerging infections, viral classifications, transmissions and preventions, viral pathogenesis, mechanisms of viral induced cancer and viral evolution, developmental biology of virally induced birth defects, factors in pathogenesis and transmission of prions.

UNIT III


Cell mediated and Gene therapy as a novel form of drug delivery, vectors, cell types. Responses to viral infections; slow and persistent infections, anti-viral agents, interferons, equipment's and materials for animal cell culture technology. Primary and established cell line cultures. Introduction to the balanced salt solution and the simple growth medium.

UNIT IV

Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium. Serum and protein free defined media and their applications. Measurements of viability and cytotoxicity. Biology and characterization of the culture cells, measuring parameters of growth. Basic techniques of mammalian cell culture in vitro; desegregation of tissue and primary culture, maintenance of cell culture, cell separation.

UNIT V

Scaling up of animal cell culture. Cell synchronization. Cell cloning and micromanipulation. Cell transformation. Application of animal cell culture. Stem cell culture, embryonic stem cells and their applications. Cell culture-based vaccines, somatic cell genetics, organ and histotypic cultures.

Vijay


MEWAR UNIVERSITY, GANGRAR, CHITTORGARH
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EUKARYOTIC MICROBIOLOGY

UNIT I

Eukaryotic microorganisms, their structure, function, diversity, and impact on human health and the environment, classification, life cycles, genetics, metabolism, interactions with host organisms, and methods of detection and control.

UNIT II

Important human and veterinary parasites, life cycle and biology of *Plasmodium*, *Entamoeba*, *Leishmania*, *Wuchereria*, *Fasciola*, *Schistosoma*, host parasite interaction.

UNIT III

Protozoa: Classification of Protozoa, general biology of protozoal cell, process of reproduction in common protozoal classes, importance of protozoa in soil and water eco-system.

UNIT IV

Elements of mycology: General classification of fungi, fungal cell structure, structure and biology of fungal spores of different kinds, reproduction in fungi, mycotoxins.

UNIT V

Yeast genetics: isolation and characterization of auxotrophic and temperature sensitive mutants, synthetic lethality, meiotic mapping, multicopy suppression.

Vijin

DIVERSITY OF LIFE FORMS AND ENVIRONMENTAL APPLICATION

UNIT I

Evolution of environment and Origin of life, Diversification of life and speciation; Classifying organisms: Concepts of phenetics and cladistics; Principles of ecological organization; Basics of structural & functional ecology; Concept of Population genetics; Basic approach to evolutionary biology and behavioral ecology; Evolutionary principles and stable strategies; types of selections.

UNIT II

Biodiversity- levels of biodiversity, alpha, beta and gamma diversity, Values and ethics of biodiversity; Global patterns of biodiversity, hotspots of biodiversity and megadiversity country; Biogeographic zones in India; factors influencing local and regional biodiversity, Biodiversity documentation.

UNIT III

Threat to species diversity, Extinction vortex, Causes of extinction; Population viability analysis; Red Data Book, Biodiversity conservation approaches: Local, National and International, In situ and ex situ conservation, Concept of protected area network, Selecting protected areas, criteria for measuring conservation value of areas, Sanctuary, National Park and Biosphere reserves; Design and management of protected areas; Threats to wildlife conservation and wildlife trade; Tools for wildlife research, Wildlife threat, Use of Radiotelemetry and Remote sensing in wildlife research

UNIT IV

Perception on Bioresource; Legal binding of biological materials- concept of Biopatents
Environmental biotechnology: Understanding biotechnology, Concept and outlines of various applications- GM crops and GMO: Environmental implications;; Biodegradation, Phytoremediation: types and applications Bio-fuel production, Bio fertilizer, Bio pesticides; Integrated Pest Management,

UNIT V

Microorganisms and environmental pollutants: Overall process of biodegradation, Environmental biomonitoring and indicator microorganisms, biodegradation of organic pollutants, anaerobic biodegradation, in-situ and ex-situ bioremediation, case studies of microbial remediation, lagoon and Vadose zone bioremediation, surface bioremediation of soils and sludge, Applied bioremediation and industrial applications, developing bioremediation technologies, Concept of Fermentation technology and Bioreactor, microorganisms and metal pollutants, metal - microbial interaction and metal remediation; Microbial transformation of pesticides.

Waste treatment - modern wastewater treatment, traditional methods, wetlands and aquaculture systems, Surface Bioremediation of soil and sludge

Vijay

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
Department of Life Science

M.SC BIOTECHNOLOGY BIOSAFETY, BIOETHICS AND IPR

UNIT I

Introduction to ethics and bioethics: Personal ethics: profession and professionalism - Moral Reasoning - Ethical theories - person as an experimenter - Moral leadership (integrity and ingenuity) - the framework for ethical decision making.

UNIT II

Biotechnology and ethics: Biotechnology in agriculture and environment: benefits and risks - benefits and risks of genetic engineering - ethical aspects of genetic testing - ethical aspects relating to the use of genetic information - genetic engineering and biowarfare.

UNIT III

Ethical implications of cloning: Reproductive cloning, therapeutic cloning; Ethical, legal and socio-economic aspects of gene therapy, germ line, somatic, embryonic and adult stem cell research- GM crops and GMOs - biotechnology and biopiracy - ELSI of the human genome project.

UNIT IV

Introduction to biosafety: Biosafety issues in biotechnology - risk assessment and risk management - safety protocols: risk groups - biosafety levels - biosafety guidelines and regulations (National and International), types of biosafety containment. Ethical issues for animal cell culture.

UNIT V

Introduction to intellectual property and intellectual property rights: Types, patents, copyrights, trade secrets and trademarks, design rights, geographical indications - the importance of IPR - patentable and nonpatentable - patenting life - legal protection of biotechnological inventions - world intellectual property rights organization (WIPO)

Suggested Readings

1. Ethics in engineering, Martin. M.W. and Schinzinger.R. III Edition, Tata McGraw-Hill, New Delhi. 2003.
2. Thomas, J. A. and Fuch, R. L. Biotechnology and Safety Assessment. Academic Press. (2002).
3. Fleming, D. A., Hunt, D. L., Biological Safety Principles and Practices. ASM Press. (2000).
4. Sateesh, M. K. Bioethics & Biosafety, IK Publishers. (2008).
5. Singh B. D. Biotechnology: Expanding Horizon. Kalyani; edition (2015)
6. Singh K., Intellectual Property Rights on Biotechnology BCIL, New Delhi. (2008).
7. Desai, V., Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House (2007).
8. Singh, I. and Kaur, B., Patent law and Entrepreneurship, Kalyani Publishers (2006).
9. Goel and Prashar, IPR, Biosafety and Bioethics, Pearson Education, India (2013)



DEPARTMENT OF LIFE SCIENCE

MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)
Department of Life Science
M.SC BIOTECHNOLOGY
MEDICAL AND PHARMACEUTICAL BIOTECHNOLOGY

Unit I

Disease diagnosis: probes, detection of genetic diseases. Uses of products of non-recombinant and recombinant organisms for disease treatment. Drug manufacturing process. Drug design: ligand-based, structure-based, active site identification, ligand fragment link, scoring method. computer-aided drug design.

Unit II

Drug metabolism: Non-Synthetic oxidation, reduction, hydrolysis, etc., conjugation reactions methylation, sulphation, etc. Factors affecting drug metabolism, Drug development process: pharmacological microbial, recombinant, biochemical and molecular level screening system and their construction strategies.

Unit III

Drug delivery-theory of controlled release drug delivery systems: zero-order kinetics, theory of diffusion: release and diffusion of drug polymers. Types of drug delivery- Targeted, Thin film, self-micro emulsifying, acoustic, neural, drug carrier, liposomes, microspheres, nanofibers, etc.

Unit IV

Antibiotics- mechanism, side effects, metabolisms, bioavailability, representative member, resistance, uses of β lactam (penicillin), aminoglycosides (Streptomycin), tetracycline, metronidazole, rifampicin, daptomycin, sulphonamides, multiple drug resistance.

Unit V

Production of Biopharmaceuticals- Insulin, Interferon. Vaccines-Live vaccines killed vaccines-Subunit vaccines-Recombinant vaccines-DNA vaccines, Applications of biotechnology in forensics. Microencapsulation in medicine, Biosensors and their application in medicine. Detection of genetic diseases: amniocentesis, carrier detection.

Suggested Readings:

- 1 Christopher, H. Gene cloning and Manipulation. Cambridge University, Press.
- 2 Nicholl, D.S.T. An introduction to genetic engineering. Cambridge University Press.
- 3 Sambrook, Russell and Maniatis. Molecular Cloning: A Laboratory Manual (Vol. I, II and III). Cold Spring Harbor Laboratory.
- 4 Glover, D.M. and Hames, B.D. DNA Cloning: A (Practical) approach. IRL Press. Oxford.
- 5 Brown, T.A. Gene cloning. Blackwell Publisher.
- 6 Kreuzar, H. and Massey, A. Recombinant DNA technology. A.S.M. Press, Washington.
- 7 Primrose, S.B. Molecular Biotechnology. Panima.
- 8 Watson and Zoller. Recombinant DNA. Panima.
- 9 Boylan, M. Genetic engineering - science and ethics on a new frontier. Pearson Edu.
- 10 Old and Primrose. Principles of Gene Manipulation.

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DEPARTMENT OF LIFE SCIENCE**

Cancer Biology

UNIT I

Introduction to Cancer Biology, Molecular Basis of Cancer, Cancer Genetics and Epigenetics

UNIT II

Cancer Cell Signaling and Pathways, Tumor Immunology and Immunotherapy, Cancer Metastasis and Invasion, Cancer Biomarkers and Diagnostic Techniques

UNIT III

Cancer Therapeutics and Drug Discovery, Cancer Genomics and Bioinformatics, Molecular Imaging in Cancer Research, Stem Cells and Cancer Stem Cells

UNIT IV

Tumor Microenvironment and Angiogenesis, Ethical Issues in Cancer Research, Molecular Biology Techniques in Cancer Research

UNIT V

Cell Culture Techniques and Cancer Cell Lines, Immunological Techniques in Cancer Research, Advanced Instrumentation and Imaging Techniques

