Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2017-18

School : *School of Studies of Engineering and Technology*

Department : *Chemical Engineering*

Date and Time : *May 24, 2017 – 11:30 AM*

Venue : *HoD room*

The scheduled meeting of members of Board of Studies (BOS) was held today in the office of HOD Chemical Engineering to design and discuss the scheme and syllabus of B. Tech. (Chemical Engg.) V and VI semester as per CBCS, also to review Pre-PhD course work Teaching Scheme for the Department of Chemical Engineering. Following members were present in the meeting.

1. Prof. S. N. Saha (Chairman. BOS and HOD, Chemical Engg.)
2. Dr. A. K. Chandrakar (Member BOS. Asst. Prof. Department of Chemical Engg.)
3. Dr. R. S. Thakur (Invited member. Asst. Prof. Department of Chemical Engg.)
4. Mr. Neeraj Chandraker (Invited member, Asst. Prof. Department of Chemical Engg.)
5. Mrs. Arita Roychaudhury (Invited Member. HoD. Industrial & Production Engg.)

In this meeting, above mentioned members discussed and proposed the scheme and syllabus of B Tech. Chemical Engineering V and VI semester as per CBCS as enclosed 26 pages duly signed by the Chairman and Members.

As per the direction from AR(Acad.), vide 1039/Acad./T.S./2017, dt. 24/03/17 w.r.t. the decision of Standing Committee of Academic Council meeting dt. 7/3/2017, the BoS Members have resolved to consider for reading the 'Seminar' subject CHPHDSO1 in already approved Evaluation scheme for Pre-Ph.D. course work as QUALIFIED / NOT QUALIFIED in consistency with other departments of this University.

The following courses were revised in the of B. Tech. Third year (V and VI Semesters) :

- Mass Transfer-I (CH5TPC07)
- Engineering Materials (CH5TPE11)
- Polymer Technology (CH5TPE14)
- Process Equipment Design-I (CH6TPE21)
- Fuel Combustion Energy Technology (CH6TPE31)

The following new courses were introduced in the of B. Tech. Third year (V and VI Semesters):

- Fundamentals Of Chemical Engineering (CH5TPE12)
- Food Engineering (CH5TPE13)
- Fluidization Engineering (CH5TOE11)

- Financial Management (CH5TOE12)
- Managerial Economics (CH5TOE13)
- Financial Accounting And Costing (CH5TOE14)
- Fertilizer Technology (CH6TPE22)
- Enterprise Resource Planning (CH6TOE22)
- Management Information System (CH6TOE23)
- Six Sigma And DOE (CH6TOE24)

Since the Member Prof. Chandan Guha (Department of Chemical Engineering. Jadavpur University, Kolkata) could not attend this meeting due to his pre-occupation, as per his suggestion on telephonic conferencing with the members, this scheme and syllabus is to be sent to the external BOS member Prof. Guha. for his review and formal consent as on today (24/5/2017).

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Signature & Seal of HoD

Scheme and Syllabus

DEPARTMENT OF CHEMICAL ENGINEERING
INSTITUTE OF TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)

LIST OF PROFESSIONAL ELECTIVES OFFERD BY THE DEPARTMENT OF CHEMICAL FOR V and VI SEMESTER

Semester	Subject Code (PE)	Subject
V	CH5TPE11	Engineering Material
	CH5TPE12	Fundamentals of Biochemical Engineering
	CH5TPE13	Food Engineering
	CH5TPE14	Polymer Technology
VI	CH6TPE21	Process Equipment Desiga-I
	CH6TPE22	Fertilizer Technology
	CH6TPE31	Fuel Combustion Energy Technology
	CH6TPE32	Environmental Engineering

PE - Professional Elective

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LIST OF OPEN ELECTIVES OFFERD FOR V and VI SEMESTER

Semester	Subject Code (OE)	Subject
V	CH5TOE11	Fluidization Engineering
	CH5TOE12	Financial Management
	CH5TOE13	Managerial Economics
	CH5TOE14	Financial Accounting and Costing
VI	CH6TOE21	Process Utility and Safety
	CH6TOE22	Enterprise Resource Planning
	CH6TOE23	Management Information System
	CH6TOE24	Six Sigma and DOE

OE- Open Elective

Note: In addition to the open elective courses, as prescribed above, the students are free to opt for any other subject of same credit from inter/intra school duly approved by the Board of Studies of the respective departments.

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CH5TPE12: Fundamentals of Biochemical Engineering (3 1 0)

Unit I: Introduction: Biotechnology, biochemical engineering, biological process, definition of fermentation, enzymes kinetics and its applications.

Unit II: Cell Cultivations: microbial cell cultivation, animal cell cultivation, plant cell cultivation, cell growth measurement, cell immobilization.

Unit III: Sterilization: Sterilization Methods, Thermal Death Kinetics, Design Criterion, Batch Sterilization, Continuous Sterilization, and Air Sterilization

Unit IV : Agitation and Aeration: Basic mass-transfer concepts, correlations form mass-transfer coefficient, measurement of interfacial area, correlations for interfacial area, gas hold-up, power consumption, oxygen absorption rate, scale-up, and shear sensitive mixing

Unit V: Chemicals of life: lipids, sugars and polysaccharides, from nucleotides to RNA and DNA, amino acid into proteins, hybrid biochemical.

Text books:

1. Fundamentals of Biochemical Engineering by Rajiv Dutta, Springer Berlin Heidelberg New York.
2. Biochemical Engineering Fundamentals by James E. Bailey and Davis F. Ollis, second edition , McGraw-Hill Book Company.
3. Biochemical Engineering by James M. Lee, Washington State University, Prentice-Hall Inc. In 1992

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CH5TPE13: Food Engineering (3 1 0)

New Course Introduced

Unit I: Introduction- General aspects of food industry, world food demand and Indian scenario, constituents of food, quality and nutritive aspects.
Food additives, standards, deteriorative factors and their control, preliminary processing methods, conversion, preservation operation and quality standards.

Unit II Energy Engineering in Food Processing - Generations of Steam, Fuel Utilization, Electric Power Utilization, Process Controls in Food Processing, Systems for Heating and Cooling Food Products.
Material and energy balance in food systems and calculation. Common unit operations in food processing – Cleaning, evaporation, crystallization.
Thermal Properties of Foods: Specific heat, Enthalpy, Thermal Conductivity, Thermal diffusivity, Latent heat, Modes of Heat Transfer - Freezing Systems , Frozen-Food Properties , Freezing Time refrigeration system for food products.

Unit III- Separation processes in food processing- Electrodialysis Systems, Reverse Osmosis Membrane Systems, Membrane Performance, Ultrafiltration Membrane Systems, Concentration Polarization.
Types of Reverse-Osmosis and Ultrafiltration Systems, Drying Processes, Dehydration Systems, Dehydration System Design, Sedimentation, Centrifugation, Mixing.

Unit IV- Production and utilization of food products –Food Process Principles: Pasteurization, Blanching, Sterilization techniques and types.
Soft and alcoholic beverages, dairy products, meat, poultry and fish products, treatment and disposal of food processing wastes.

Unit V- Packaging - Introduction, Food Protection, Product Containment, Product Communication, Product Convenience.
Innovations in Food Packaging, Food Packaging and Product Shelf-life, Food canning technology, fundamentals of food canning technology.

Text book:

1. Introduction to Food Engineering by R. Paul Singh, Dennis R. 5th Edition

Reference books:

1. Fundamentals of Food Engineering by Stanley Charm.
2. Fundamentals of Food Process Engineering by Toledo RT; 2nd ed, 2000, CBS Publishers
3. Fundamentals of Food Processing Operation by Heid, J.L. and Joslyn, M.A, The AVI Publishing Co; Westport, 1967.
4. Food Process Engineering by Heldman, D.R, The AVI Publishing Co; Westport, 1975.
5. Encyclopedia of Food Engineering by Hall, C.W; Farall, A.W. & Rippen, A.L, Van Nostrand - Reinhold.

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CH5TOE11: Fluidization Engineering (3 0 0)

Unit I : Phenomenon of Fluidization, Industrial applications of fluidized beds.

Unit II : Gross behavior of fluidized beds-Minimum fluidizing velocity and pressure drops; Voidage, Transport disengaging height.

Unit III : Bubbles in dense beds-Davidson Model, stream of bubbles, Bubbling bed models.

Unit IV : Emulsion phase, Turn-over rate of solids, Residence Time Distribution of Solids, Diffusion model of solids movement, Interchange coefficient of solid into and out of wake.

Unit V : Flow Pattern of Gas through fluidized beds, diffusion model for gas flow: two region models, evaluation of interchange coefficients.

Text book:

1. Fluidization Engineering by D Kunil and O Levenpiel, John Wiley, 1969

References book:

1. Fluidization by J. F. Davidson and D. Harrison, Academic Press 1971.
2. Fluidization and Fluid Particles Systems by F.A. Zenz and D. F. Othmer, Reinhold Publishing,1960

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CH5TOE12: Financial Management (3 0 0)

Unit I : Introduction, scope and objective, organisation of finance function,

Time value risk and return and valuation of money, valuation of long term securities various model of pricing.

Unit II : Statement of changes in financial position , sources and uses of working capital ,cash flow statement, balance sheet, profit loss account and its process.

Financial ratio analysis- meaning, types , importance and limitataions, calculation of various ratios.

Unit III : Capital budgeting- principals, techniques ,various methods of capital budgeting.

Concept and measurment of cost and capital, and various approaches for measurement of cost of capital and computation.

Analysis of risk and uncertainity-various approaches for risk evauation.

Unit IV : Theory of working capital management – concept and delination of gross, working capital and net working capital, trade off between profitability and risk

Unit V : Operating financial and combined leaverage- introduction, defination and concept and various approaches.

Text books:

1. Financial Management by Khan and Jain, TMGH
2. Financial Management by Kuchhal, Vikas Publication
3. Financial Management- Paresh Shah-Willey India Pvt. Ltd.

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New Course Introduced

CH5TOE13: Managerial Economics (3 0 0)

Unit I : Introduction to Managerial Economics, Different Area of Managerial Economics, Micro and Macro Economics, Nature and Scope of Managerial Economics- Demand Analysis, Law of Demand and its Exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Supply Analysis, Law of Supply, Elasticity of Supply: Definition, Types, Measurement and Significance of Elasticity of Supply.

Unit II : Law of Return, Revenue Analysis, Theory of Production and Cost Analysis: Production Function, Cobb-Douglas Production Function, ACMS Production Function, Investment Function. Cost Analysis: Cost Concept, Opportunity Cost, Fixed Vs Variable Cost, Explicit Costs Vs Implicit Costs, Out of Pocket Costs Vs Imputed Costs. Break-even Analysis (BEA) - Determination of Break-even Point (Simple Problem) - Managerial Significance and Limitation of BEA.

Unit III : Introduction to Market & Pricing Policies: Element of Market , Types of Market, Concept of Market, Classification of Market based on the nature of competition, Types of Competition, Features of Perfect Competition, Feature of Imperfect Competition, Monopoly and Monopolistic Competition, Price-Output Determination in case of Perfect Competition and Monopoly. Objectives and Policies of Pricing: Introduction, Full Cost or Cost plus Pricing, Differential Pricing, Going Rate Pricing, Marginal Cost Pricing, Trade Association Pricing, Loss Leadership Pricing, Administered Pricing

Unit IV: Forms of Business Organization: Introduction, Definition, Essential Element of Good Organization, Principles of Organization, Formal and Informal Organisation, Organisation Structure, Concept of Ownership Organization, Types of Ownership, Partnership, Joint Stock Company, Types of Joint Stock Company, Co-Operative Organization, Public Sector Organisation. Capital and Capital Budgeting: Capital and Its Classifications, Need of Working Capital and Its Assessment, Factors Affecting Working Capital, Fundamental of Accounting, Types of Capital, Method and Sources of Raising Finance ,Nature and Scope of Capital Budgeting, Features of Capital Budgeting Proposals, Method of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (Simple Problems).

Unit V: Fundamental of Financial Accounting: Nature of Accounting, Important Accounting Terminology, Accounts and Types of Accounts, Rules of Debit and Credit, System of Book Keeping, Book of Accounts, Journal, Ledger, Trial Balance, Final Account, Trading Account, Profit and Loss Accounts and Balance Sheet.

Financial Analysis Through Ratios: Classification of Financial Ratios, Liquidity Ratios, Leverage Ratios, Activity Ratios, Profitability Ratios, Current Ratio, Acid Test Ratio, Debt Equity Ratio, Assets Coverage Ratio, Debt Service Coverage Ratio, Inventory Turnover Ratio, Debtor Velocity Ratio, Creditor Velocity Ratio, Gross Profit Ratio, Net Profit Ratio, Return on Equity Ratio.

Text Books:

1. Managerial Economics by Yogesh Maheshwari, PHI
2. Managerial Economics By Joel Dean, PHI
3. Managerial Economics By Craig H. Petersen, W. Cris Lewis, Sudhir K Jain
4. Financial Accounting For Management By Ambrish Gupta, Pearson Eduction
5. Managerial Economics By H. Craig Peterson & W. Cris Lewis, PHI
6. Managerial Economics By Suma Damodaran, Oxford University Press
7. Managerial Economics and Financial Analysis By Aryasri, TMH

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CH5TOE14: Financial Accounting and Costing (3 0 0)

Unit I : Financial Accounting: Introduction to Book keeping, Double-entryaccounting, Journal & Ledger posting, Financial Statements & Analysis,Trial balance, preparation of Trading and Profit & Loss account and Balance Sheet.

Unit II : Ratio Analysis: Balance sheet ratios-current ratio, Fixed Asset ratio,Liquidity ratio, Capital Gearing Ratio, Profit-loss account ratios-Gross Margin ratio, Net Margin Ratio, Combined ratios-Return on Investment ratio, Net Profit to Total Assets ratio, Creditors turnover ratio.

Unit III : Costing: Objectives of costing, Elements of costing, methods of costing, preparation of cost sheet, job costing, Marginal costing, absorption costing, Process costing and Standard Costing-Material, labour, overhead cost variance, Activity Based Costing and Target Costing, Cost-Profit-Volume analysis and problems on cost-volume-profit analysis.

Unit IV : Working Capital Management: Introduction, concepts of working capital,operating and cash conversion cycle, permanent and variable workingcapital, balanced working capital position, determinants of working capital, Estimating working capital needs, Policies for financing current assets, Issues in working capital management.

UNIT-V

Capital Budgeting: Nature and scope of capital budgeting, features of capital budgeting, Methods of capital budgeting-DCF, NON-DCFtechniques-Accounting rate of Return, Net present Value, Payback period, discounted payback period, Profitability Index.

Text Books :

1. T. Vijaya Kumar, Accounting for Management, 1/e, Tata McGraw-Hill, 2009.
2. I. M. Pandey, Financial Management, 9/e, VikasPulishing House, 2009.
3. M.Y. Khan and P. K. Jain, Cost Accounting, 2/e, TMH, 2014.
4. M.Y. Khan and P. K. Jain, Management Accounting: Text, Problems and Cases, 6/e TMH, 2013.
5. M.Y. Khan, P. K. Jain, Basic Financial Management, 3/e, TMH, 2000.

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V.D. Saha 24/5/17

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CH6TPE22: Fertilizer Technology (3 1 0)

Chemical fertilizers and organic manures – types of chemical fertilizers, Nitrogenous fertilizers- Methods of production, Characteristics, Specification and storage of ammonium sulphate, ammonium nitrate and ammonium chloride and urea Phosphatic fertilizers- Methods of production, Characteristics, Specification and storage of single super phosphate, triple super phosphate, Potassic fertilizers- Methods of production, Characteristics, Specification and storage of potassium chloride, potassium sulphate and potassium schoenite; Complex and NPK fertilizers-Methods of production, Characteristics, Specification and storage of Mono ammonium phosphate, Diammonium phosphate, Nitrophosphates, Fertilizers And Environment.

Text Books :

1. Commercial Fertilizers by G.H. Collings, 5th Edn., McGraw Hill, New York, 1955.
2. Chemistry and Technology of Fertilizers by A.V. Slacks, Interscience, New York, 1966.

Reference Book :

1. Editorial board-Handbook of fertilizer technology, The Fertilizer Association of India, New Delhi, 1977.

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CH6TOE22: Enterprise Resource Planning (3 0 0)

Unit I : Introduction to Enterprise resource planning, Evolution of ERP, MRP, MRP-II, e-ERP, Generic business model with reference to ERP, Structure of ERP Two tier architecture client, server, Three tier architecture, repository, RDBMS, Operating systems, Generic model of ERP system - Design tree node structure, Design of, Role/Activity Diagrams, Benchmarking, Types of Benchmarking, Process of Benchmarking.

Unit II : Introduction to Business Process Re-engineering, Procedure of BPR, Principle of BPR, Process improvement Process redesign.

Unit III : Introduction : Supply chain Management and ERP, understanding the supply chain with case examples, Supply chain performance with measures, Achieving strategic fit and scope, Supply chain drivers, Supply chain obstacles, ERP Vs SCM, Benefits of supply chain improvement, Introduction of Logistics Types of Logistics, Types of Logistics, Benefits of Logistics.

Unit IV: Integrated SAP model, Integrated Data, Master Data, Transactional Data, Integrated processes, Evolution Electronic Data Interchange (EDI), Use of EDI, and Benefits of EDI, Selection of ERP: Introduction Opportunities and problems in ERP selection, Approach to ERP selection of ERP.

Unit V: Origins of SAP, SAP's Markets, SAP architecture and integration, SAP Business structure, Customization of SAP, SAP R/3 material Management, Sales and Distribution, Production, Plant Maintenance, Quality Management, Methodology for ERP implementation, Implementation phases, Implementation of Life cycle, Implementation failure

Text Books:

1. Enterprise Resource Planning: Theory and practice by Rahul V, PHI Publication.
2. Enterprise Resource Planning: Concepts and practice by V.K. Garg, TMH Publication.
3. Enterprise Resource Planning by Alexis Leon, McGraw-Hill Publication

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CH6TOE23: Management Information System (3 0 0)

Unit I : Organisation & Types, Decision Making, Cost & value of information, Intoductuion to Information in business, types of informaton system ,need , importance , scope and charecterstics of information system. Component of information system , developing information system.

MIS concept evaluation and charecterstics structure of MIS , MIS v/s data processing, MIS and DSS

Unit II : Solving Business Problems with Information System, Concept of Balanced MIS, Effectiveness & Efficiency Criteria. Tool and Techniques of MIS- dataflow diagram, flow chart etc.

Data base technology- introduction, data base and enterprice management, data independence data base approaches , data base architecture , data models , DBMS SQL and working , 4GL, data administration.

Unit III : Business application of information technology: electronic commerce Internet, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information system for managerial Decision Support, Information System for Strategic Advantage.

Unit IV : Managing Information Technology, Enterprise & Global Management, Security & Ethical Challenges, Planning & Implementing Change. Reports: Various types of MIS reports, GUI & Other Presentation tools.

Unit V : Advanced concepts in information system: Enterprise Resource Planning: introduction, various modules like Human Resources, Finance, Accounting, Production & Logistics. Supply Chain Management, CRM, Procurement, Management System Object Oriented modeling case studies.

Text Books:

1. Introduction to Information System by O. Brian, McGraw Hill.
2. Management Information System by O. Brian TMH.
3. MIS by Rahul De, Wiley.
4. MIS by Louden and lauden, PHI
5. Information System Analysis & Design by Bansal, TMH.
6. Management Information System by Jawadegar, TMH.
7. Information System for Modern Management by Murdick, PHI.
8. Enterprise Resource Planning by Alexis Leon, TMH.
9 MIS by Sadagopan, PHI

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CH6TOE24: Six Sigma and DOE (3 0 0)

Unit I : Quality Perception : Quality in Manufacturing, Quality in Service Sector, Differences between Conventional and Six Sigma concept of quality.
Probability Distribution: Normal, Binomial, Poisson distribution.
Basics of Six Sigma: Concept of Six Sigma, Defects, DPMO, DPU, Attackson X'S, Customer focus, Six Sigma for manufacturing, Six Sigma for service, Z score, Understanding Six Sigma organization, Leadership council, Project sponsors and champions, Master Black Belt, Black Belt, Green Belts.

Unit II : Methodology of Six Sigma: DMAIC, DFSS, Models of Implementation of Six Sigma, Selection of Six Sigma Projects. , Introduction to software for Six Sigma,Understanding Minitab, and Graphical analysis of Minitab plots.

Unit III : Six Sigma Tools: Project Charter, Process mapping, Measurement system analysis, Hypothesis Testing, Quality Function deployment, Failure mode effect analysis,\

UNIT-IV: Design of Experiments,: Applications of experimental Design, basic principles, design guidelines, statistical design and problems. Experimental design; statistical analysis of data. Loss function and its calculations.

Unit V : Comparative Experiments: Statistical concepts, sampling and sampling Distributions, Inferences about the differences in means, randomized design, and inference about differences in means paired comparison design, inferences about the variances of normal distributions, problems. Experiment with single factor: the analysis of variance (ANOVA), analysis of fixed effects models, model adequacy checking, practical interpretation of results, sample computer output, determining the sample size, discovering the dispersion effect, the regression approach to the ANOVA, and non-parametric method in the ANOVA.

Text Books:

1. Lean Six Sigma Using Sigma XL and Minitab by Issa Bass, Barbara Lawton, 1/e, Tata McGraw-Hill, 2010.
2. DOE by phillip ross PHI.
3. What is Six Sigma by P. Pande and L. Holpp, 1/e, Tata McGraw-Hill, 2002.
4. The Six Sigma Way by P. Pande, 1/e, Tata McGraw-Hill, 2003.
5. What is Design for Six Sigma by R. Cavanagh, R. Neuman, P. Pande, 1/e, Tata McGraw- Hill, 2005.
6. Six Sigma by KK BHOTE Mc-graw hill.
7. Design and Analysis of Experiments by D.C. Montgomery, 8th Edition, John Wiley.

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