B.E.MBA integrated in ELECTRICAL & ELECTRONICS
VIII SEMESTER

Elective-II
(i) Electrical Machine Design
(ii) High Voltage AC-DC
(iii) Advance Control Systems

A student can exercise option I and Option II according to the following:

A student may opt for one semester training in lieu of subjects of 8th Semester. The marks for six months training will be equal to the total marks of 8th Semester study. A student can opt for six semester training under following conditions:-

a) The student got selected for job in campus placement and the employer is willing to take that student for the training.
b) The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Chairperson/Coordinator of the respective branch.
c) BEMBA students are required to do six months training in management function areas only

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<th>Ref No.</th>
<th>Subject</th>
<th>SCHEDULE OF TEACHING</th>
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<td>EE-801</td>
<td>Non – Conventional Energy Sources</td>
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<td>EE-807</td>
<td>Embedded System Design</td>
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<td>EE-857</td>
<td>Embedded System Design (Lab)</td>
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<td>EE-808</td>
<td>Elective –II</td>
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<td>Major Project</td>
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**Elective-II**

A student can exercise option I and Option II according to the following:

- The student got selected for job in campus placement and the employer is willing to take that student for the training.
- The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Chairperson/Coordinator of the respective branch.
- BEMBA students are required to do six months training in management function areas only.
EE-801
Non – Conventional Energy Sources

External: 50 L T P
Sessional: 50 3 1 0
Credits: 4

Note: Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt at least two questions from each part.

Part-A

INTRODUCTION: Limitation of conventional energy sources, need and growth of alternative energy source, basic scheme and application of direct energy conservation. (4)

MHD GENERATORS: Basic principles, gaseous, conduction and hall effect, generator and motor effect, different types of MHD generator, types of MHD material, conversion effectiveness, analysis of constant area MHD generator, practical MHD generator, application and economic aspects. (8)

THERMO-ELECTRIC GENERATORS: Thermoelectric effects, Seeback effect, Peltier effect, Thomson effect, thermoelectric converters, figures of merit, properties of thermoelectric material, brief description of the construction of thermoelectric generators, application and economic aspect. (8)

PHOTO VOLTAIC EFFECT AND SOLAR ENERGY: Photovoltaic effect, different types of photovoltaic cells, cell fabrication, characteristics of photovoltaic cells, conversion efficiency, solar batteries, application, solar radiation analysis, solar energy in India, solar collectors, solar furnaces and applications. (8)

Part-B

FUEL CELLS: Principle of action, Gibb's free energy, general description of fuel cells, types, construction, operational characteristics and application. (6)

MISCELLANEOUS SOURCES: Geothermal system, characteristic of geothermal resources, choice of generator set, electric equipment precautions low hydro-plants, definition of low head hydrometer, choice of site, choice of turbine wind power, history of wind power, wind machines, theory of wind power, characteristic of suitable wind power site, tidal energy, idea of tidal energy, tidal electric generator. (10)

Recommended Books:

Power System Engineering A Chakrabarti, M. L. Soni, P. V. Gupta and U. S.
Bhatnagar, Dhanpat Rai & Co.

EE-807
Embedded Systems

External: 50 L T P
Sessional: 50 3 1 0
Credits: 4

Note for Examiner- Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt at least two questions from each part.
PART A

1. Introduction to Embedded Hardware and Software
   Terminology – Gates – Timing diagram – Memory – Microprocessor buses – Direct
   memory access – Interrupts – Built interrupts – Interrupts basis – Shared data problems–
   Interrupt latency, RISC Machines, ARM family history
   (8 hours)

2. Cortex-M0 MCU Architecture and Programming
   Cortex-M0 MCU (NUC140): Architecture ,Instruction Set, Thumb Instruction Set,
   Interrupt handling mechanism , Instruction cycle timings , Development tools and
   ‘C’compiler programming.
   (8 hours)

3. Cortex-M0 MCU (NU-LB-NUC140) Application and Interfacing
   GPIO, A/D converter, LCD Interfacing, SD card interface, keypad matrix USB and CAN
   2.0
   (7 hours)

PART B

4. Software Development and Tools
   Software architectures, Round – Robin, Round-Robin with Interrupts, Function Queue
   Scheduling architecture, Introduction to assembler – Compiler –n Cross compilers and
   Integrated Development Environment IDE, Linker/ Locators, Simulators, Getting
   Embedded software into target System Debugging Strategies.
   (8 hours)

5. Introduction to Real Time Operating Systems
   Task And Task States, Tasks and Data, Semaphores and shared data, Interrupt Routines in
   an RTOS Environment, Basic Design Using RTOS,RTOS using Keil RTX, Free
   RTOS,MC/OS-II
   (8 hours)

6. Operating System and MCU Peripheral Services
   Message queues, Mailboxes and Pipes, Timer Function, Events, Memory Management
   and peripheral services
   (6 hours)

TEXT BOOKS

OTHER BOOKS:
3. Ramani Kalpathi : ARM Based system design ,Sigma Publication, Chennai, 2013
List of Experiments

1. Introduction to Cortex-M0 (NU-LB-NUC140) learning board.
2. To learn about embedded C programming using Keil µvision4.
3. LED interface using NU-LB-NUC140 learning board.
4. LCD interface using NU-LB-NUC140 learning board.
7. SD card interface using NU-LB-NUC140 learning board.
10. CAN 2.0 using NU-LB-NUC140 learning board.

EE-808 (a)  
Electrical Machine Design

Part-A

1. **Principles of design of Machines:** Specific magnetic and electric loadings output, Real and apparent flux densities, temperature rise calculation, Separation of main dimension for DC machines, Induction machines and synchronous machines. (8)

2. **Heating cooling and ventilation:** Cooling of machines, types of ventilation, continuous and intermittent rating. (4)

3. **Design of Transformers:** General considerations, output equation, emf per turn, choice of flux density and current density, main dimensions, leakage reactance and conductor size, design of tank and cooling tubes, calculation of losses, efficiency and regulation, forces winding during short circuit. (10)

Part-B

4. **Three Phase Induction Motors:** General considerations, output equation, choice of specific electric and magnetic loadings, efficiency, power factor, number of slots in stator and rotor, elimination of harmonic torques, Design of stator and rotor winding, slot leakage flux, leakage reactance, equivalent resistance of squirrel cage rotor, magnetizing current, efficiency from design data. (12)
5. **Alternators:** Types of alternators, comparison, specific loadings, output co-efficient, design of main dimensions. (8)

6. Introduction to Computer Aided Electrical Machine Design. (3)

**Books Suggested:**

2. Say M.G. The Performance and Design of A.C. Machines, PITMAN (ELBS).
Note: Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is requ

**Part-A**

**INTRODUCTION:** Introduction of DC Power transmission technology – Comparison of AC and DC transmission – Application of DC transmission – Description of DC transmission system– Planning for HVDC transmission – Modern trends in DC transmission. (7)

**ANALYSIS OF HVDC CONVERTERS:** Pulse number – Choice of converter configuration – Review of Graetz circuit – valve rating, Transformer rating. Simplified analysis of Graetz circuit, without overlap only, Principles of DC link control, converter bridge characteristics – Characteristics of a twelve pulse converter – Detailed analysis of converters. (10)

**HARMONICS AND FILTERS:** Sources of harmonics in HVDC systems – Smoothing reactors – Corona and radio interference effects – harmonic distortion factor, types of AC filters, DC filters. (6)

**Part-B**

**GENERATION OF IMPULSE VOLTAGE AND CURRENT:** Introduction to standard lightning and switching impulse voltages, analysis of single stage impulse generator, expression for output impulse voltage, multistage impulse generator, components of multistage impulse generator, generation of switching impulse voltage, generation of high impulse current. (8)

**MEASUREMENT OF HIGH VOLTAGES:** Chubb for HVAC measurement. Standard sphere gap measurements of HVAC, HVDC and impulse voltages, Factors affecting the measurements, Surge current measurement-Klydanograph and magnetic links. (6)

**NON-DESTRUCTIVE INSULATION TESTING TECHNIQUES:** Dielectric loss and loss angle measurements using Schering Bridge, transformer ratio Arms Bridge, need for discharge detection, factor affecting the discharge detection, discharge detection methods-straight and balanced methods. (8)

**TEXT BOOKS:**


**REFERENCE BOOKS:**

EE- 808(c)
Advanced Control Systems

External: 50 L T P
Sessional: 50 3 1 0
Credits: 4

Note: Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is requ

Part A
Review of Control Engineering: Time response and Frequency response methods, Root locus method; Compensation Techniques and Controllers: Design of feedback control system; Types of compensation: Series or cascade, feedback, state feedback, series feedback; Lead compensator; Lag compensator; Lag-lead compensator, Controllers: PI, PD, PID. (12)

State Space Techniques: Review of state space representation of systems by various methods. Solution of state equations-state transition matrix. Transfer function from state variable model; Controllability & observability of state variable model; optimal control systems; pole placement using state variable; limitations of state variable feedback. (10)

Part B
Digital Control Systems: Introduction; sampled data control systems: Sampler and hold circuit; z-transform; Pulse transfer function; Stability analysis of discrete systems. (10)

Robust Control Systems: Robust control systems and system sensitivity analysis of robustness; Systems with uncertain parameters; Design of Robust control systems; Three term PID controller. (13)

Recommended Books:
1. Automatic Control Systems by B.C.Kuo, Prentice Hall of India
2. Modern Control Engineering by Ogatta, Prentice Hall of India.
4. Modern Control Systems by Dorf and Bishop, Addison Weslay.
Paper Title: Business Research

7

Paper Code: IBM-801
Credits: 3

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50
Time: 3 Hours
Total Lecture: 45
L T P : 3 0 0

Note: Examiner will set 7 questions of equal marks. First question will cover whole syllabus, having 5 conceptual questions of 2 marks each and is compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is requ

Objectives: The main objective of this subject is to help the students to understand the nature, scope, complexities and process of defining a business research question. The learning focus is on developing business research skills to underpin the approach taken to a work integrated project.

PART-A
Research Design formulation, Exploratory, Descriptive and Casual Research , Exploratory Research Design- Secondary Data , Primary Data , Qualitative Research-Focus Group Interviews, Depth Interviews, Analysis of Qualitative Data, Survey and observation- Survey methods, Observation method, Casual Research Design- Experimentation, Validity in Experimentation, Extraneous variables, Statistical Designs- Randomized-Block Design, Latin Square Design, Factorial Design

Measurement and Scaling- Primary Scales of measurement, Comparative Scaling Techniques, Non comparative Scaling techniques-Likert , Semantic Differential Scale, Stapel Scale, Questionnaire Design- question content, structure and order

PART-B
Sampling Design: Meaning and need of Sampling, Probability and non-probability sampling design, simple random sampling, systematic sampling, stratified sampling, cluster sampling and convenience,sampling , judgement and quota sampling (non-probability), determination of sample size, Hypothesis Testing, Parametric and Non-Parametric Tests

Discriminant and Logit Analysis- Formulating the problem for Discriminant analysis , Multiple Discriminant Analysis, Logit model

Factor analysis, Cluster analysis and Multidimensional Scaling - Conducting Factor analysis, Cluster analysis and Multidimensional Scaling- Conjoint Analysis

Text Books:
2. Marketing Research-Text and Cases, Rajendra Nangundkar , TMH
3. Marketing Research –GC Beri, TMH
4. Marketing Research- Parshuram, Dhruv Grewal, R.Krishnan – Biztantra
Paper Title: Financial Management

Paper Code: IBM-802
Credits: 3
Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50
Time: 3 Hours
Total Lectures: 45
L T P: 3 0 0

Note: Examiner shall set eight questions, four from Part – A and four from Part – B of the syllabus. Candidate will be required to attempt any five questions selecting at least two from each part.

Objective: The objective of this course is to create basic understanding of corporate finance, Capital Budgeting decisions, working capital management, project management etc in the Engineering profession.

PART-A

Introduction to Financial Management: Meaning; Scope; Finance Function; Financial Goals; Agency Problem; Relationship of Finance with Accounts and Economics.

Sources of Finance: Features; Advantages and Limitations of Equity Shares; Preference Shares; Debentures; Term-Loans; Right Issue.

Cost of Capital: Meaning; Calculation of Cost of Debt Capital; Equity Capital; Preference Capital; Retained Earnings; Weighted Average Cost of Capital.

Capital Structure: Meaning; Determinants; Assumptions; Net Income and Operating Income Approach; Traditional Position; M-M Position; EBIT and EPS Analysis; Capital Structure and Taxation.

Leverage Analysis: Meaning; Types; Estimation of Financial; Operating and Combined Leverage; Relation of Financial Leverage with Risk and Return.

Management of Working Capital: Meaning of WC; Need of WC Management; Determinants of WC; Operating Cycle; Estimation of WC.

PART-B

Inventory Management: Meaning; Need to hold Inventory; Objective of Inventory Management; Inventory Investment Analysis; Inventory Control System.

Capital Budgeting: Meaning; Basic Principles of Costs and Benefits; Investment Criteria; Pay back Method; Accounting Rate of Return Method; Net Present Value Method; Benefit-Cost Ratio; Internal Rate of Return; Capital Rationing; Introduction to Basic Techniques of Risk Analysis in Capital Budgeting.

Dividend Decisions: Meaning and Types of Dividend; Issues in Dividend Policy; Traditional Model; Walter Model; Gordon Model; Miller and Modigliani Model; Bonus Shares and Stock Splits.

Suggested Readings:
1. Financial Management, Van Horne ,PHI