GTU

Draft Document

Proposing a new scheme to design and evaluate GTU question papers

Marwadi Education Foundation

13th March 2014

Contents

Part - A

1. Proposed design flow
2. Sample question paper scheme

Part – B

1. Ideatech
2. Design Clinic

"Proposed Design Flow:"
"GTU Syllabus & Question Paper Scheme"

Part - A

The design aspects related to syllabus and question paper is based on the following teaching –learning – attributes

ATTRIBUTES
1.   REMEMBERING
2.   UNDERSTANDING
3.   APPLICATIONS
4.   ANALYSIS
5.   SYNTHESIS & DESIGN

1. Remembering   - 20%

- Definition's
- Formulae's
- Graphs & Charts
- Derivation's

2. Understanding - **30%**

- Concepts & Principle's
- Design Equations – Process & Procedures
- Tools & Techniques (H/W + S/W)
- Direct substitution: Concept based problems

3. Applications - **20%**

- Examples of Application of Principles in real world
- S/W operational skills & capabilities
- Paper – Design (Simple – Problems)
- Validating Paper Design with S/W Design
- Verifying & Studying specifications (Lab – Industry visit, etc.) - Linkage with item 4

4. ANALYSIS   -   15%

- Understanding Specification & Redefining   Specifications for new design
- S/W based simulations
  - simulation with redefined specs and tweaking – for novel outcomes or industry applications
  - with the option of incorporating new – concept – ideas & taking it to next level. For translation or conversion to working model.

** Strategic Analysis – leading to Industry needs

    Result Interpretation & Publication conference

    Impact & outcome Scenario's

Notes:
- Basic idea: To spot novel students ideas; & to merge the gap between theory & Practice
- To study inter – relationship among design parameters.
- To write simple eq. based algorithm

5. Synthesis & Design   -   15%

- Design problem formulation & Spec – generation
- Tactical – Problem – Solving leading to context**
  (Transition from Strategic to Tactical)
- Design for Results
- Prototyping & S/w based conforming
- Publications & Patents

Consolidating

- Suggested question paper scheme for;

    1. UG

    2. PG

Proposed Architecture of GTU-UG Paper Scheme

- **Remembering**   **30 marks**
  - Definition
  - Formulas – Direct application Problems (numerical)
  - Derivations
- **Understanding**   **30 marks**
  - Design Process Flow
  - Hardware – Component and circuits (exploded view) – transition from subsystem to system level
  - Software Proficiency : commands, layout scheme & translation techniques to prototyping - capability to utilize software to set up a schematic architecture leading to virtual test bench
- **Application**   **40 marks**
  - Produce Paper Design (with given Space's)
  - Manual Design   ⎤ (translation from manual to software)
  - Software Design   ⎦
  - Validate using Simulations
  - Interpretation of outcomes

Proposed Final Architecture of GTU-PG Paper Scheme

- **Application**   **20 marks**
  - Produce Paper Design (with given Space's)
  - Manual and Software Design   (translation from manual to software)
  - Simulate, Validate and Interpret

- **Analysis**   **30 marks**
  - Transition from conventional design knowledge to towards Strategic Design
  - Spec – 1   to   Proposed Spec – 2
  - And Interpretation in terms of parameter – relationships
  - Note: Can be Journal paper based .

- **Synthesis & Design**   **50 marks**
  - Transition from strategic knowledge towards tactical knowledge
  - Ideation & Tactical Design validation via S/W based simulations
  - Compare, interpret, propose, write, and communicate to Journal
  - Linkage to design clinic and technical report (ideation meet)

Sample Question Paper Scheme
Draft Only
(a subtopic has been handpicked for the purpose of demo)
Mechanical Engineering

Subject :   Alternate Energy Sources

              (Course of 6th Semester)

Topic :   Wind Energy

Part 1 : [Remembering] weightage : 20%

- 1. What is optimum velocity?

- 2. Draw the pressure and velocity diagram across the rotor of wind turbine.

- 3. list methods which are used to control the fluctuation of power in wind turbine.

Part 2 : [understanding]
Weightage : 30%

- 4. Explain the significance of optimum velocity.

- 5. Prove that in case of horizontal axis wind turbine maximum power can develop when exit velocity is one third of wind velocity.

- 6. With neat sketch explain Wind Energy Conversion System (WECS).

Part 3 : [Application]
Weightage : 50%

- 7. What is the range of optimum velocity in the actual practice?

- 8. Explain practical importance of power coefficient.

- 9. How the fluctuation of power is controlled practically during the operation of wind turbine?

Civil Engineering

Subject :   Earthquake Engineering

Topic :   Fundamentals of Earthquake

                    Vibrations

(a subtopic has been handpicked for the
purpose of demo)

1.   Remembering - 20%

- 1.   What is the D' Alembert's equation equilibrium?
- 2. Define : Time period, SDOF system, Dynamic Degree of Freedom, Resonance and Natural frequency.

2. Understanding – 30%

- 3. Explain about the dynamic equilibrium of a SDOF system subjected to free vibration.

- 4. For a given structure comprising of two or more floors, explain the process of evaluating the time period and natural frequency.

- 5. Why is structure comprising of two floors can be evaluated as two dynamic degree of freedom.

3.   Application - 50%

- 6. Give examples of Strucure which can be idealized and analyzed as SDOF system.

- 7. Design a framed foundation in such a way that the frequency ration does not exceed 0.5, if it supports a machine having a mass of 5000kg and operating at a speed of 200rpm. Consider the frame to be supported on two columns having size of 300mm*300mm and concrete grade of M25. Assume the depth of foundation 2.0m from ground level. Consider beam as a infinitely rigid.

Electrical Engineering

- Subject: Power Electronics

   (Course of 6 th Semester)

- Topic :   Inverter

(a subtopic has been handpicked for the
purpose of demo)

Part 1 [Remembering] 20%

- 1. Explain the performance parameters of inverter.

- Define harmonics and write mathematical equations

- 2. What is selective harmonics eliminating? Explain selective harmonics elimination in brief.

Part 2 [Understanding] 30%

- 3. Source and Conditions for harmonic generation in devices, systems and circuits with examples.

- Examples of real world problems on harmonics

- The single phase half - bridge inverter has a resistive load of R = 2.4 Ω and the dc input voltage is V_s = 48 V. Determine (1) the rms output voltage at fundamental frequency, (2) the THD (3) the Distortion factor (DF), (4) harmonics factor (HF) and DF of lowest order harmonic (LOH).

- 4. Calculate the angle α for selective harmonics eliminating techniques to removes the 5th and 7th order harmonics.

Part - 3 [Application] 50%

- 5. Explain the shut active filter using selective harmonics elimination.

- 6. In the above Q.5, if have to remove the 3rd ,5th ,7th and 11th order of harmonics, using single phase full-bridge inverter with multiple bipolar notches. Determined the number of notches to be introduced and their angle.

PART - B

- To spot and recognize 10% good students, and to motivate them to participate, undertake, and pursue: Application oriented concepting, analysis & design engineering - having the potential of converting to a grand project scheme, and added equivalence to a niche theory paper – expanded knowledge.

- To place & position and consider as per recommendation of the technical committee following;

  1. *Scrutiny – Academic / Research's/ Industry*

  2. *Explore and thread*

  3. *Transact to Design - Clinic*

  4. *Separate exam scheme – based on project leading to Grand – Project – Report*

     - To provide Technological knowledge

     - To provide P. M. skills

     - Funding avenues and opportunities

Ideation Meet :
GTU Technical Report and "IDEA-TECH" Meet

- To study & prepare a GTU technical report document (GTU – idea & … report), say a technology journal of new ideas – every six months, showcased (seminar) amongst industries and researchers. And to handpick 10% students projects for IDEA-TECH, under ideation week hosted by GTU.

- (Ideation Week)

- Purpose:
    1. New Concepts
    2. Problem Identifications
    3. Training and skilling
    4. Patent Initiatives
    5. Industry Interface Initiatives
    6. Entrepreneurship initiatives

Design Clinic – Level 1

- The **idea** is to bring together Teachers, Researchers, Students (UG and PG) under one roof to interact, guide, share, and nurture expertise - Knowledge & Resources; for the sole purpose of advancement , betterment, and sustained outcomes. Ideation week (IDEA-TECH) will function as the connecting link and trigger.

- Mechanism:

- To identify through scrutiny, a team of people with new ideas and concepts that could possibly impact technology, industry, lives and civilizations.

- Inputs from Ideation week and Technical report.

- Final Impact and Feasibility studies…. (transition to level two – prototyping)

Level – 2

- **Input source:** Recommendations following Impact and feasibility study reports
- To consider & take high impact value ideas to market via the path of Industry & entrepreneurship.
- To fund such ideas & concepts
- To create knowledge , advance , and apply knowledge for betterment of life and humanity.
- Final outcome: Produce , Propagate , Preserve, and Protect (4P's)