Gokaraju Rangaraju Institute of Enigineering and Technology
(Autonomous)

EXAMINATION BRANCH

GRIET/COE/3H/G/23-24   03 Aug 2024

(GR20 REGULATIONS)
OFFLINE MOOCS EXAMINATIONS AUGUST 2024 PROCEDURE
FOR

GR20 Regulations	2020 Admitted Batch

The students who appear for the above examinations scheduled in the month of August 2024 are to note that the procedure for internal and external examinations are as follows

Note:

1. For those students who completed their course work and could not attain required credits through MOOCS courses are only eligible. And Syllabus will be same as MOOCS course.

2. Internals Questions paper comprises of 30 Multiple choice questions carries 1 mark each. Exam Duration is 45 minutes. Examinations will be conducted on the same day of External Exam from 02.00 PM to 02.45 PM.

3. External Examination follows GR20 Regulations theory Exam Pattern comprises Part-A & Part-B. Part-A contains 10 Short Answer type Questions carries 2 marks each. Part-B contains 5 Long Answer type Questions with internal choice carries 10 marks each

4. Exam Subjects and their syllabi are attached below.

S No.	Department	Subject Name
1	CIVIL	Plastic Waste Management
2	CIVIL	Safety In Construction
3	EEE	Introduction to Internet of Things
4	EEE	Cloud Computing
5	MECHANICAL	Robotics
6	MECHANICAL	Corrosion Protection method
7	ECE	The Joy of Computing using Python
8	ECE/CSE	Data Science for Engineers
9	CSE	Data Analytics with Python
10	IT	User Centric Computing for Human Computer Interaction
11	IT	Big Data Computing

PLASTIC WASTE MANAGEMENT
(CIVIL)
Syllabus

UNIT I
Introduction-Plastics-Types, Uses and Global Statistics, Plastic Waste – Sources, Production.

UNIT II
Plastic Waste- Global and Indian Context, Plastic Waste Management Rules 2016 (India) and Global Rules and Regulations.

UNIT III
Plastic Bans- Plastics bans including China Sword Policy implication on global plastic waste management, Impact of Plastics on Marine Life, Effect on Wildlife, Human Health and Environment.

UNIT IV
Plastic Waste Management Practices – Use of Plastic waste in roads, issues and challenges.

UNIT V

Alternate Materials to Plastics – Possible alternate materials to plastic- Greener Alternatives, Plastics Resource Recovery and Circular Economy.

SAFETY IN CONSTRUCTION
(CIVIL)
Syllabus

UNIT I
Introduction -Basic terminology in safety, types of injuries, safety pyramid, Accident patterns, theories of accident-causation.
UNIT II
Safety Budget -Planning for safety budget, safety culture, Introduction to OSHA regulations; Role of stakeholders in safety.
UNIT III
Safety Programs -Site safety programs - Job hazard analysis, accident investigation & accident indices-violation, penalty.
UNIT IV
On Site Safety -Safety during construction, alteration, demolition works - Earthwork, steel construction, temporary structures, masonry & concrete construction, cutting & welding
UNIT V
Safe Operating Procedures – SoPs, Construction equipment, materials handling-disposal & hand tools, Other hazards – fire, confined spaces, electrical safety; BIM & safety

INTRODUCTION TO INTERNET OF THINGS
(EEE)
Syllabus

Unit -1: Introduction to IoT
Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs .

Unit -2: IoT & M2M
Machine to Machine, Difference between IoT and M2M, Software define Network.

Unit -3: Challenges in IoT
Design challenges, Development challenges, Security challenges, Other challenges.

Unit -4: Applications of IoT
Home automation, Industry applications, Surveillance applications, Other IoT applications.

Unit 5 : Developing IoTs
Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.

CLOUD COMPUTING
(EEE)
Syllabus

Unit 1: Introduction to Cloud Computing, Cloud Computing Architecture

Unit 2: Service Management in Cloud Computing, Data Management in Cloud Computing

Unit 3: Resource Management in Cloud, Cloud Security

Unit 4: Open Source and Commercial Clouds, Cloud Simulator

Unit 5: Research trend in Cloud Computing, Fog Computing

ROBOTICS
(MECHANICAL)
Syllabus

UNIT I: Introduction
Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

UNIT II: Components of the Industrial Robotics
Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT III:
Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems. Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT IV:
Differential transformation and manipulators, Jacobians – problems. Dynamics: Lagrange – Euler and Newton – Euler formations – Problems. Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion –straight line motion – Robot programming, languages and software packages.

UNIT V:
Robot actuators and Feedback components: Actuators: Pneumatic, Hydraulic actuators, electric &stepper motors. Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.
Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading-Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

CORROSION PROTECTION METHOD
(MECHANICAL)
Syllabus

UNIT I: Introduction
Different methods for corrosion protection Cathodic protection - Principle of cathodic protection - Calculation method to determine protection efficiency - Materials used for cathodic protection

UNIT II: Anodic protection
Principle of anodic protection - Calculation method to determine protection efficiency Protection by Design - Different design aspects for protection of metals and alloys - Best practices

UNIT III: Protection by Inhibitor
Principle of using inhibitor - Reaction mechanism for corrosion protection - Different inhibitors available in use

UNIT IV: Protection by Coating
Philosophy of using coating - Different coating routes - Coating methods. Protection by change of environment - Philosophy of using change in environment - Different ways of execution of change in environment

UNIT V:Effect on Corrosion Protection
Effect of microstructure, Stress, surface texture and composition on corrosion protection
- Alloying- Structures - Surface texture

THE JOY OF COMPUTING USING PYTHON
(ECE)
Syllabus

UNIT-I Motivation for Computing, Welcome to Programming, Variables and Expressions: Design your own calculator, Loops and Conditionals : Hopscotch once again. Lists, Tuples and Conditionals : Lets go on a trip, Abstraction Everywhere : Apps in your phone, Counting Candies , Crowd to the rescue, Permutations : Jumbled Words.

UNIT- II Magic square, Birthday Paradox: Find your twin, Guess a Movie Name, Analyse your Facebook data : 20 questions game : I can read your mind. Google Translate : Speak in any Language, Currency Converter : Count your foreign trip expenses, Monte Hall : 3 doors and a twist, Sorting : Arrange the books, Searching : Find in seconds.

UNIT-III Substitution Cipher : What's the secret !!, Tic-tac-toe game, Recursion, Snake and Ladder game, Sprial Traversing, GPS Tracking, Tuples, Image Processing: Fun with images, Jumble words, Anagrams .

UNIT-IV Natural Language processing, Sentiment Analysis : Spot the similarities Count the words : Hundreds, Thousands or Millions, Author Stylometry, Introduction to networkx, Six degree of separation etc, FLAMES, Data Compression techniques.

UNIT-V Browser Automation, Fun with calendar, Collatz Conjecture, Page rank algorithm

DATA SCIENCE FOR ENGINEERS
(Common to ECE & CSE)
Syllabus

UNIT I: Introduction to R, Variables and datatypes in R, Data frames, Recasting and joining of data frames, Recasting and joining of data frames, Arithmetic, Logical and Matrix operations in R, Advanced programming in R : Functions, Control structures, Data visualization in R Basic graphics.

UNIT II: Linear Algebra and Statistics for Data Science: Solving Linear Equations, Linear Algebra Distance, Hyperplanes and Half spaces, Eigenvalues, Eigenvectors, Statistical Modelling, Random Variables and Probability Mass/Density Functions, Sample Statistics.

UNIT III: Introduction to Data Science, Solving Data Analysis Problems - A Guided Thought Process, Predictive Modelling, Linear Regression, Model Assessment, Diagnostics to Improve Linear Model Fit.

UNIT IV: Simple Linear Regression Model Building, Cross Validation, Multiple Linear Regression Modelling Building and Selection.

UNIT V: Classification, K - Nearest Neighbors (KNN), K - Nearest Neighbors implementation in R, K - means Clustering,K - means implementation in R.

DATA ANALYTICS WITH PYTHON
(CSE)
Syllabus

UNIT 1: **Introduction to data analytics and Python fundamentals:** Introduction to Data analytics, Python Fundamentals – I, Python Fundamentals – II, Central Tendency and Dispersion – I, Central Tendency and Dispersion – II, Important Data Files.
Introduction to probability: Introduction to Probability- I, Introduction to Probability- II, Probability Distributions – I, Probability Distributions – II, Probability Distributions – III.

UNIT II: Sampling and sampling distributions: Python Demo for Distributions, Sampling and Sampling Distribution, Distribution of Sample Means, population, and variance, Confidence interval estimation: Single population – I.
Hypothesis testing: Confidence interval estimation: Single population – II, Hypothesis Testing- I, Hypothesis Testing- II, Hypothesis Testing- III, Errors in Hypothesis Testing, Hypothesis Testing: Two sample test- I, Important Data Sets.

UNIT-III: Two sample testing and introduction to ANOVA: Hypothesis Testing: Two sample test- II**,** Hypothesis Testing: Two sample test- III**,** ANOVA – I**,** ANOVA – II**,** Post Hoc Analysis(Tukey's test)**,**
Two way ANOVA and linear regression: Randomize block design (RBD)**,** Two Way ANOVA**,** Linear Regression – I**,** Linear Regression – II, Linear Regression – III.

UNIT-IV: Linear regression and multiple regression: Estimation, Prediction of Regression Model Residual Analysis, Estimation, Prediction of Regression Model, Residual Analysis – II, MULTIPLE REGRESSION MODEL – I, MULTIPLE REGRESSION MODEL-II, Categorical variable regression.
Concepts of MLE and Logistic regression: Maximum Likelihood Estimation- I, Maximum Likelihood Estimation-II, LOGISTIC REGRESSION- I, LOGISTIC REGRESSION-II, Linear Regression Model Vs Logistic Regression Model.
ROC and Regression Analysis Model Building: Confusion matrix and ROC- I, Confusion Matrix and ROC-II, Performance of Logistic Model-III, Regression Analysis Model Building – I, Regression Analysis Model Building (Interaction)- II.

UNIT-V
c^2 Test and introduction to cluster analysis: Chi - Square Test of Independence – I, Chi-Square Test of Independence – II, Chi-Square Goodness of Fit Test, Cluster analysis: Introduction- I, Clustering analysis: part II.
Clustering analysis: Part III, Cluster analysis: Part IV, Cluster analysis: Part V, K- Means Clustering, Hierarchical method of clustering –I, Hierarchical method of clustering- II,
Classification and Regression Trees (CART): Classification and Regression Trees (CART : I), Measures of attribute selection ,Attribute selection Measures in CART : II,Classification and Regression Trees (CART) - III

USER CENTRIC COMPUTING FOR HUMAN COMPUTER INTERACTION
(IT)
Syllabus

UNIT 1: **Introduction:** Introduction to User Centric Computing(UCC) and history, Issues and challenges, Latest research trends, User-Centric Design and Software Engineering.

UNIT II: Engineering User-Centric Systems: Components of SDLC - Contextual Inquiry, - Design Guidelines Prototyping.

UNIT III: User-Centric Computing: The UCC framework with illustrative case study, User-Centric models descriptive, predictive models and taxonomy, Introduction to GOMS family of models
Computational user models (classical), Keystroke-Level Model(KLM), (CMN)GOMS Model, The Fitts' Law, The Hick-Hyman Law

UNIT IV: Computational user models(contemperory): 2D and 3D pointing models, The steering Law and constrained navigation, Model for hierarchial menu selection, Mobile typing models(sibgle finger and two thumb typing), Model for touch performance(FFitts' law),
Formal system models: Introduction to formal models in UCD, Formal modelling of user-computer dialogue.

UNIT-V: Empirical Research Methods: Introduction and research question formulation, Variables determination and experiment design, Data Analysis including model building
User-Centric Design Evaluation: Introduction to User-Centric design evaluation and expert evaluation technique, : User evaluation and model-based evaluation

BIG DATA COMPUTING
(IT)
Syllabus

Unit-1: Introduction to Big Data : Big Data Enabling Technologies, Hadoop Stack for Big DataHadoop Distributed File System (HDFS),Hadoop MapReduce 1.0,Hadoop MapReduce 2.0

Unit-2: Introduction to Big Data Platforms : Parallel programming with Spark, Introduction to Spark,Spark built in libraries ,Design of key value stores,
Big Data Storage: Introduction to Big Data Storage Platforms for Large Scale Data Storage,Data Placement strategies, CAP Theorem, Consistency Solutions, CQL, Design of Zookeeper.

Unit- 3: Big Data Streaming Platforms for Fast Data: Design of HBase, Spark Streaming and Sliding Window Analytics (Part-I) Sliding Window Analytics,Introduction to Kafka.

Unit 4: Introduction to Big Data Machine Learning with Spark :
Machine Learning Algorithm K-means using Map Reduce for Big Data Analytics, Parallel K-means using Map Reduce on Big Data Cluster Analysis , Decision Trees for Big Data Analytics,Big Data Predictive Analytics

Unit-5 Big Data Applications:Graph Processing Parameter Servers, PageRank Algorithm in Big Data Spark GraphX & Graph Analytics ,Data Analysis using Spark GraphX