GURU NANAK DEV ENGINEERING COLLEGE, LUDHIANA

Academic Section

AS/81/ 1827

Dated: 09.12.2024

Circular

HoDs (UG-Engineering)

Students of UG-Engineering are required to fill and lock choices in the order of preference (**'1' being the best choice**) of Open Elective Mandatory Course (Non-Credit) & Open Elective-I for 6th Semester, Open Elective-II for 8th Semester for Academic Session Jan-June'25 as mentioned below. Option "Fill Open Elective/Open Elective-I/ Open Elective-II Choice" are available under "**Control Panel**" Tab at ***https://academics.gndec.ac.in.***

The details of **Open Elective Mandatory Course (Non-Credit) for 6th Semester** are as under:

Sr. No.	Subject Code	Paper ID	Subject Title	Applicable UG Programs
1.	MCI-102	16422	Constitution of India	CE, IT, ME
2.	MCI-103	17274	Organizational Behavior	

The details of **Open Elective –I (6th Semester)** offering subjects are as under:

Sr. No.	Subject Code	Paper ID	Subject Title	Applicable UG Programs	Offering Deptt.
1.	OEEC-103	17549	Consumer Electronics	CE ,CSE, EE, IT, ME	ECE
2.	OEME-106	17152	Industrial Engineering	CE, CSE, EE, ECE, IT	MPE
3.	OECS-113	17550	Cloud Computing-I*	CE, EE, ECE, ME	CSE/IT
4.	OECE-103	17154	Project Management and Monitoring	CSE, EE, ECE, IT, ME	CE
5.	OEEE-101	17123	Energy Auditing & Management	CSE, ECE, IT, ME	EE

* To be offered through AWS (Amazon Web Services) Academy.

The details of **Open Elective –II (8th Semester)** offering subjects are as under:

Sr. No.	Subject Code	Paper ID	Subject Title	Applicable UG Programs	Offering Deptt.	Remarks
1.	OECE-105	17347	Environment Impact Assessment	CSE, EE, ECE, IT, ME	CE	--
2.	OECS-114	17614	Cloud Computing-II	CE, EE, ECE, ME	CSE/IT	To be offered through AWS (Amazon Web Services) Academy.
3.	OEEC-107	17551	Fundamentals of Mechatronics	CE, EE, ME, CSE,IT	ECE	--
4.	OEME-112	17693	Entrepreneurship Practices	CE, CSE, EE, ECE, IT	MPE	In collaboration with Wadhwani Foundation under National Entrepreneurship Network (NEN) Initiative**.
5	OEEE-109	17553	Electric Vehicles	CE, ECE, ME, CSE, IT	EE	--

**This course will enable a student to build final pitch deck by the end of course. The students will develop business sense asthey build on their idea to MVP to Business Planning.

Syllabi of above mentioned open elective subjects are available on College Notice Board.

It is mandatory for the students to fill three choices for Open Elective-I & Open Elective-II priority-wise and two choices for Open Elective Mandatory Course (Non-Credit). In case, a student does not perform this activity in time then Academic Section will do the allotment without considering student's choices.

Portal for Open Elective choice filling will be operational from 09.12.2024 to 16.12.2024 (till 3:00PM).

Note:

1. Cloud Computing-II subject will be offered only to those students who have studied Cloud Computing–I in 6th Semester as Open Elective-I.
2. After locking the filled choices, students will not be able to change it.
3. Open Elective-I, Open Elective-II and Open Elective Mandatory Course (Non-Credit) will be offered only if strength ofstudents is more than or equal to 30 for that particular subject.

9/12/24

Assistant Registrar

Copy to: -

1. Principal for information
2. HoDs (UG Engineering) - to inform concerned students so that choice filling can be done on time.
3. Office copy

Subject Code : OECS-113
Subject Name: Cloud Computing-I

Programme: B.Tech (CSE)	**L:** 3 **T:** 0 **P:** 0
Semester: 6th	**Teaching Hours:** 36
Theory / Practical: Theory	**Credits:** 3
Inte rnal Marks: 40	**Percentage of Nume rical/Design/Programming Proble ms:** 10%
External Marks: 60	**Duration of End Semester Exam (ESE) :** 3 hrs
Total Marks: 100	**Elective Status :** Open Elective

Additional Material Allowed in ESE: [NIL]

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Use Amazon Web Services (AWS) console for different cloud services and understand the structure of AWS cloud.
2	Apply Amazon Elastic Compute Cloud (Amazon EC2), Amazon Simple Storage Service (S3), and Amazon CloudFront service on AWS cloud
3	Implement cloud security and monitor the working of AWS cloud.
4	Use database and load balancing service on AWS cloud.
5	Make use of Elastic Beanstalk and AWS simple monthly calculator.
6	Use Machine learning, Artificial intelligence, and Blockchain technology services on AWS cloud

Detailed Contents:

Part-A

Introduction to Amazon Web Services (AWS) Cloud: Global infrastructure of AWS cloud, Cloud Services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), Cloud storage. Structure of Cloud: Availability Zone, Edge Location, Origin, Latency, Region. Introduction to AWS Console. [06]

Virtual Servers, Content Delivery and Virtual Storage: Virtual Servers: Amazon Elastic Compute Cloud (Amazon EC2), Domain Name, Domain Name System (DNS), Amazon S imple Storage Service (S3) bucket, Amazon Route 53, Javascript Object Notation (JSON), Dynamic website, Static website. Content Delivery: Amazon CloudFront, AWS Direct Connect, Caching, Content Delivery Network (CDN), Distribution. Virtual Storage: Amazon Simple Storage Service (Amazon S3), Amazon Elastic Block Store (Amazon EBS), Hard Disk Drive (HDD), Solid State Drive (SDD), Input / Output Operations Per second (IOPS) [08]

Cloud Security and Monitoring the Cloud: Cloud Security: AWS Identity and Access Management (IAM), Role, User, Security group, Policy, Amazon Inspector, Root User, Credential, Multi-Factor Authentication (MFA), AWS shield, AWS Web Application Firewall (WAF), Distributed Denial of Service (DDoS), AWS Artifact. Monitoring the Cloud: Amazon CloudWatch, AWS CloudTrail, AWS Config, Amazon Simple Notification Service (Amazon SNS) [06]

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Head
Deptt. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

Part-B

Databases and Load Balancing: Databases: Relational database, Amazon Relational Database Service (Amazon RDS), Amazon DynamoDB, Nonrelational database, Amazon Redshift, Online Transaction Processing (OLTP), Online Analytic Processing (OLAP), Amazon Aurora, MySQL. Load balancing: Load balancer, Amazon ElastiCache, Data caching, Elastic Load Balancing, Random Access Memory (RAM) [06]

Elastic Beanstalk, CloudFormation, Billing and Support: AWS Elastic Beanstalk, AWS CloudFormation, Stack. Billing and Support: AWS simple monthly calculator, AWS support plan, Consolidated billing, Technical Account Manager (TAM) [05]

Emerging Technologies in Cloud and Cloud Optimization: Machine Learning (ML), Artificial Intelligence (AI), Amazon SageMaker, Deep Learning, AWS DeepRacer, AWS DeepLens, Neural network, Blockchain technology. Cloud optimization using AWS Cloud Development Kit (CDK). [05]

Text Books:

1. Raj Kumar Buyya, James Broberg, Andrezei Goscinski, "Cloud Computing: Principles and Paradigms", First edition, John Wiley & Sons Inc.
2. Barrie Sosinsky, "Cloud Computing Bible", First edition, Wiley India Pvt. Ltd.

Reference Books:

1. John Rittinghouse, James F.Ransome, "Cloud Computing: Implementation, Management, and Security", International edition, CRC Press Taylor and Francis Group.
2. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper," Cloud Computing for Dummies", International edition, John Wiley & Sons Inc.

E –Books and online learning Material:

1 Types of Cloud Computing: https://aws.amazon.com/types-of-cloud-computing/ accessed on July 21st, 2022.
2 Amazon EC2: https://aws.amazon.com/ec2/ accessed on July 21st, 2022.
3 Amazon S3: https://aws.amazon.com/s3/ accessed on July 21st, 2022.
4 Tutorial: Configuring a Static Website on Amazon S3: https://docs.aws.amazon.com/AmazonS3/latest/dev/HostingWebsiteOnS3Setup.html accessed on July 21st, 2022.
5 Amazon EBS volume types: https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ebs-volume-types.html accessed on July 21st, 2022.
6 AWS Cloud Security overview: https://aws.amazon.com/security/ accessed on July 21st, 2022.
7 Amazon Inspector: https://aws.amazon.com/inspector/faqs/ accessed on July 21st, 2022.
8 AWS Shield: https://aws.amazon.com/shield/faqs/ accessed on July 21st, 2022.
9 AWS WAF: https://aws.amazon.com/waf/faqs/ accessed on July 21st, 2022.
10 AWS Artifact: https://aws.amazon.com/artifact/faq/ accessed on July 21st, 2022.

Head
Dept. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

11 AWS Config: https://aws.amazon.com/config/ accessed on July 21st, 2022.
12 AWS CloudTrail: https://aws.amazon.com/cloudtrail/ accessed on July 21st, 2022.
13 Amazon CloudWatch : https://aws.amazon.com/cloudwatch/ accessed on July 21st, 2022.
14 Amazon Simple Notification Service: https://aws.amazon.com/sns/ accessed on July 21st, 2022.
15 Amazon Relational Database Service: https://aws.amazon.com/rds/ accessed on July 21st, 2022.
16 Amazon Redshift : https://aws.amazon.com/redshift/ accessed on July 21st, 2022.
17 Amazon Aurora : https://aws.amazon.com/rds/aurora/ accessed on July 21st, 2022.
18 Elastic Load Balancing : https://aws.amazon.com/elasticloadbalancing/ accessed on July 21st, 2022.
19 Caching Overview : https://aws.amazon.com/caching/ accessed on July 21st, 2022.
20 Amazon ElastiCache : https://aws.amazon.com/elasticache/ accessed on July 21st, 2022.
21 AWS CloudFormation : https://aws.amazon.com/cloudformation/ accessed on July 21st, 2022.
22 AWS Elastic Beanstalk: https://aws.amazon.com/elasticbeanstalk/ accessed on July 21st, 2022.
23 Compare AWS Support Plans: https://aws.amazon.com/premiumsupport/plans/ accessed on July 21st, 2022.
24 AWS DeepRacer: https://aws.amazon.com/deepracer/ accessed on July 21st, 2022.
25 SageMaker: https://aws.amazon.com/sagemaker/ accessed on July 21st, 2022.
26 AWS DeepLens: https://aws.amazon.com/deeplens/ accessed on July 21st, 2022.
27 Blockchain on AWS: https://aws.amazon.com/blockchain/ accessed on July 21st, 2022.
28 Getting started with the AWS CDK:
https://docs.aws.amazon.com/cdk/latest/guide/getting_started.html accessed on July 21st, 2022.

Online Courses and Video Lectures

1 Amazon EC2 https://www.youtube.com/watch?v=TsRBftzZsQo accessed on July 21st, 2022.
2 Amazon S3: https://www.youtube.com/watch?v=_I14_sXHO8U accessed on July 21st, 2022.
3 Amazon EBS: https://www.youtube.com/watch?v=77qLAl- lRpo accessed on July 21st, 2022.
4 Amazon RDS: https://www.youtube.com/watch?v=eMzCI7S1P9M accessed on July 21st, 2022.
5 DynamoDB: https://www.youtube.com/watch?v=sI- zciHAh-4 accessed on July 21st, 2022.
6 Amazon Redshift: https://www.youtube.com/watch?v=lWwFJV_9PoE accessed on July 21st, 2022.
7 CloudWatch: https://www.youtube.com/watch?v=a4dhoTQCyRA accessed on July 21st, 2022.
8 CloudTrail: https://www.youtube.com/watch?v=mXQSnbc9jMs accessed on July 21st, 2022.
9 Set up of an Amazon CloudFront Distribution:
https://www.youtube.com/watch?v=KIltfPRpTi4 accessed on July 21st, 2022.
AWS Cloud Development Kit: https://www.youtube.com/watch?v=bz4jTx4v-l8 accessed on July 21st, 2022.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Head
Deptt. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

Guru Nanak Dev Engineering College, Ludhiana

Department of Electronics and Communication Engineering

B. Tech. (Electronics and Communication Engineering)

Subject Code: OEEC-103

Subject Name: Consumer Electronics

Programme: B.Tech.	**L:** 3 **T:** 0 **P:** 0
Semester: 6	**Teaching Hours: 39**
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design Problems:** NA
External Marks: 60	**Duration of End Semester Exam (ESE):** 3 hours
Total Marks: 100	**Elective Status:** Open Elective Course

Prerequisites: Basics of Electronics

Additional Material Allowed in ESE: NIL

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes	POs	PSOs
CO1	Identify various types of analog and digital signals	1(2)	1(2)
CO2	Troubleshoot audio systems	2(2),4(2)	1(2)
CO3	Analyse the composite signal used in various power supplies and video systems	2(3)	1(3)
CO4	Identify & troubleshoot colour TV receivers	3(3)	1(3),3(2)
CO5	Maintain compliance with various electronic appliances	3(2)	1(2)
CO6	Troubleshoot different types of microphones	4(2)	1(3)

Detailed Contents:

Part A

Audio Video Fundamentals **7 hours**

Microphones: Characteristics of microphones; types of microphones (Carbon, crystal, dynamic,velocity); types of headphones(crystal, moving iron, electrostatic, dynamic);Hearing impairments; Audiometry; Hearing Aids; Inside a hearing aid; Distortion in tape equipment; Noise reduction: Pre emphasis and De-emphasis , Companders, Noise Reduction systems

Controlling and Troubleshooting Systems **8 hours**

Power Supplies: Voltage Regulation, Zener DiodeShunt Stabiliser, Transistor Shunt Stabiliser, UPS,Troubleshooting in Audio systems, troubleshooting in Video Systems

Television Practices **8 hours**

Colour TV standards and systems : Dispersion and recombination of light , Primary and secondary colours, Attributes of colour, Luminance signal, Chrominance Signal ,Colour picture tube, Difference between colour picture tube and monochrome; Colour TV systems, Compatibility Considerations.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Part-B

Consumer Applications and Electronic Devices **8 hours**

Calculators: Structure and Internal Organisation of Calculator, Servicing Electronic Calculators, Digital Clocks, LSI Digital clocks; In-Car Computers : Applications, Electronic Ignition, Antilock Braking system, Instrument panel Displays;Microwave Ovens: Transit time, Waveguides, types of microwave ovens, microwave cooking, wiring and safety Instructions, Air Conditioners : components of air conditioning system, remote control buttons; Refrigeration: Refrigerants, Refrigeration system, Domestic Refrigerators.

Product Compliance **8 hours**

Product safety and liability issues; standards related to electrical safety and fire hazards, EMI/EMC requirements, design techniques for ESD, RF interference and immunity,line current harmonics and mains voltage surge.

Text Books:

1. Bali, S.P., "Consumer Electronic", Pearson,2007.
2. Gupta, R.G., "Audio Video System principles, maintenance and troubleshooting" , McGraw Hill,2010.

Reference books and other resources:

1. Dhake,A.M. "Television and Video Engineering",McGraw Hill,2006.

E Books Online Learning Material:

1. Microphone-https://www.coursehero.com/file/18404103/7- microphonesppt/
2. CD player: www.tclauset.org/cpg132/albums/FTPuploads/ppt_05/CDs_SperoS.ppt
3. Television: https://www.slideshare.net/Pravinshirek07/colour-television

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Subject Code: OEME-106 **Subject Name: Industrial Engineering**

Programme: B.Tech. (ME)	**L:** 3 **T:** 0 **P:** 0
Semester: 6th/ 7th/8th	**Teaching Hours:** 40
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design/Programming – 0%**
External Marks: 60	**Duration of End Semester Exam(ESE):** 3hr
Total Marks: 100	**Course Status:** Open Elective

Prerequisites: NIL.

On completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Know the functions and required qualities of an Industrial Engineer.
2	Apply work sampling and time study techniques for productivity improvement.
3	Identify and analyze the effect of working environment on worker's health.
4	Learn about relevant management concepts.
5	Decide and Manage the plant location and layout effectively.
6	Use modern techniques of industrial engineering for betterment of industry

Detailed Contents:

Part -A

1. **Basics of Industrial Engineering:** Objectives, need and scope of industrial engineering, Functions of industrial engineering department, Qualities of an industrial engineer, Role of an industrial engineer in industry, Relevance of industrial engineering to achieving performance excellence in industry. **04 Hrs**
2. **Plant Location & Layout:** Importance of plant location, Factors affecting the plant location, Comparison of rural and urban sites. Needs for a good plant layout, Different types viz. Product, process and combination layouts, Development of plant layout. **06 Hrs**
3. **Productivity**: Concept of productivity, Difference of production and productivity, Factors affecting the productivity, Reasons for low productivity, Methods to improve productivity, Productivity improvement programs. **04 Hrs**
4. **Work Analysis:** Need and scope of Work Analysis. Method-study: objectives, step-by-step procedure, charts and diagrams for recording data. Principles of motion economy. Work–measurement: Techniques of work measurement such as work-sampling, stopwatch time study. Need for rating operator, methods of rating, allowances and their types, standard time. Use of standard data techniques. **06 Hrs**

Part - B

5. **Ergonomics**: Need and relevance of ergonomics in industry, introduction to anthropometry, considerations in designing man machine systems, effect of environmental considerations like heat light, ventilation, humidity etc. on human performance, Occupational health and Safety Standard (OHSAS). **06 Hrs**
6. **Concepts of Management:** Planning, Organizing, Staffing, Directing and Controlling, Centralization versus decentralization of authority and responsibility, Concept of benchmarking. **04 Hrs**
7. **Total Employees Involvement (TEI):** Empowering employees: team building; quality circles; reward and Recognition; education and training, Suggestion schemes. **04 Hrs**

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

8. **Current Trends:** Definitions, Scope and Applications of Agile manufacturing, Six Sigma, Value Engineering, Just-in-time, Total quality management, Enterprise resource planning, , Kaizen, Total Productive Maintenance. failure mode effect analysis. **06 Hrs**

Text Books

1. A.P. Verma, *"Industrial Engineering & Management"*, S. K. Kataria & Sons, 2014.
2. H.S. Shan, *"Work Study and Ergonomics"* Dhanpat Rai & Co. , 2004.
3. A. Shtub & Y. Cohen, *"Introduction to Industrial Engineering"*, CRC Press, Taylor & Francis Group.
4. O.P. Khanna, *" Industrial Engineering and Management"* , Dhanpat Rai & Co.
5. Philip E Hick, *"Industrial Engineering & Management"*, Tata McGraw Hill, 1994.

Reference Books:

1. Telsang Martand, *"Industrial Engineering & Production Management"*, S Chand & Co, 2006.
2. ILO, *"Introduction to Work Study"*, Oxford and IBH Publishing, 3rd Edition, 2008.
3. Lee J. Krajewski, *"Operations Management: Processes and Supply Chains"*, Pearson Education, 2016.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Subject Code: ~~OPEE-101~~ OEEE-101
Subject Name: Energy Auditing and Management

Programme: B.Tech (EE)	**L: 3 T: 0: P: 0**
Semester:6	**Teaching Hours**: 36L
Theory/Practical: Theory	**Credits:**3
Internal marks: 40	**Percentage of Numerical/Design/ Programming Problems:**40%
External Marks: 60	**Duration of End Semester exam (ESE):** 3 hr
Total marks: 100	**Elective Status:**Open Elective

Prerequisites: Basic Electrical Engineering
Additional Material allowed in ESE:Scientific Calculator
On Completion ofthe course, the student will have the ability to:

CO#	Course Outcomes (CO)
1.	Understand the current energy scenario and importance of energy conservation.
2.	Enumerate the concepts of energy management.
3.	Apply the methods of improving energy efficiency in different electrical systems.
4.	Understand the concepts of different energy efficient devices.
5.	Have knowledge of various instruments used for energy audit
6.	Have an idea about various international protocols/agreements related to energy conservation.

DETAILED CONTENTS

PART-A

Energy Scenario **(6 Hours)**
Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Energy Conservation Act-2001 and its features.

Basics of Energy and its various forms **(6 Hours)**
Electricity tariff, load management and maximum demand control, power factor improvement, selection & location of capacitors, benefits of power factor improvement, performance assessment of PF capacitors, Thermal Basics-fuels, thermal energy contents of fuel, temperature & pressure, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity & heat transfer, units and conversion.

Energy Management & Audit **(6 Hours)**
Definition, energy audit, need, types of energy audit. Energy management (audit) approach understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel & energy substitution, energy audit instruments, Material and Energy balance, Facility as an energy system, methods for preparing process flow, Sankey Diagram, material and energy balance diagrams.

PART-B

Energy Efficiency in Electrical Systems **(6 Hours)**
Electricity billing, distribution and transformer losses. Electric motors Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors, Specifications of energy efficient motors & Transformers.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

PAGE 32 OF 37

H.O.D.
Deptt. of Electrical Engineering
G.N.D. Engineering College
Ludhiana-141 006.

Energy Efficiency in Industrial Systems **(6 Hours)**

Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test, factors affecting the performance and savings opportunities in HVAC, Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling towers.

]Energy Efficient Technologies in Electrical Systems **(6 Hours)**

Automatic power factor controllers, soft starters with energy saver, variable speed drives, electronic ballast, occupancy sensors, energy efficient lighting controls, energy saving potential of each technology. Applications of Instruments used in energy audit: Clamp Meter, Multimeter, Maximum demand indicator, Tacho meter, Energy Analyzer, Thermal Imager.

Text/References:

1 Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)
2 Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online)
3 S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.
4 Success stories of Energy Conservation by BEE, New Delhi (www.bee-india.org)

Websites:

https://beeindia.gov.in/content/energy-auditors

https://www.peda.gov.in/

H.O.D.
Deptt. of Electrical Engineering
G.N.D. Engineering College
Ludhiana-141 006.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

PAGE ...33... OF ...37...

Guru Nanak Dev Engineering College, Ludhiana
Department of Civil Engineering
Syllabus
B.Tech. (Civil Engineering)
2018 Admission Batch Onwards
Subject Code: OECE-103
Subject Name: Project Management & Monitoring

Programme: B.Tech. (Civil Engineering)	**L:** 3 **T: 0 P:** 0
Semester: 6	**Teaching Hours:** 40 Hours
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design Problems:** 30%
External Marks: 60	**Duration of End Semester Exam (ESE):** 3 Hours
Total Marks: 100	**Course Category:** Open Elective

Additional Material Allowed in ESE: NIL

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Understand the need of project planning and device a plan to define the work to be performed in construction project.
2.	Utilize various tools and techniques of project management and develop more realistic schedule by identifying the central problem and analyze the alternatives.
3.	Analyze time estimates of different activities and events in a network for better controlling of project by identifying critical path.
4.	Determine minimum total cost and minimum project time by conducting a crash program.
5.	Develop understanding about techniques of updating, allocation of resources and rescheduling a project.
6.	Apply computer skills to project management and evaluation.

Detailed Contents:

Part-A

Introduction **6 hr**

Need for project planning & management, time, activity & event, bar-chart, Milestone chart, uses & draw backs

PERT **12 hr**

Construction of PERT network, time estimates, network analysis, forward pass &backward pass, slack, critical path, data reduction, suitability of PERT for research project, numerical problems.

Part-B

CPM **12 hr**

Definitions, network construction, critical path, fundamental rules, determination of project schedule, activity time estimates, float types, their significance, numerical problems.

Prof. & Head of Civil Engg. Deptt.
G. N. D. E. College,
LUDHIANA

23/26

PAGE 47 OF 47

Assistant Registrar (Academics)
Guru Nanak Dev College,
Ludhiana 141001

Cost Analysis and Contract **12 hr**

Type of costs, cost time relationships, cost slopes, conducting a crash programme, determining the minimum total cost of project, numerical problems, updating a project, when to update, time grid diagram, resource scheduling, planning of different components of engineering projects. Introduction of relevant open-source software(s).

Text Books:

1. Srinath L.S.PERT and CPM - Principles and Applications. East West Press, 2001.
2. Jha K.N. Construction Project Management: Theory and Practices. 2nd edition, Pearson Education India, 2015.
3. Verma M. Construction Equipment & Planning and Application. Metropolitan Book Co, 1975.
4. Shrivastava U.K. Construction Planning and Management. Galgotia Publications Pvt. Ltd., 2000.

Reference Books/Codes:

1. Punmia B.C. and Khandelwal K.K. Project Planning and Control with PERT and CPM. 4th edition, Laxmi Publications Private Limited, 2016.
2. Wiest J.D. & levy F.K. Management Guide to PERT & CPM. Prentice Hall, 1970.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Prof. & Head of Civil Engg. Deptt.
G. N. D. E. College,
LUDHIANA

24/26

PAGE 44 OF 47

Subject Code: OECE-105
Subject Name: Environmental Impact Assessment

Programme: B.Tech. (Civil Engineering)	**L:** 3 **T: 0 P:** 0
Semester: 7/8	**Teaching Hours:** 36 Hours
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design Problems:** 20%
External Marks: 60	**Duration of End Semester Exam (ESE):** 3 Hours
Total Marks: 100	**Course Category:** Open Elective

Additional Material Allowed in ESE: NIL

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Identify different aspects related to EIA
2.	Understand the implications related to large scale development projects.
3.	Apply the knowledge gained through the subject to assess the feasibility of a project
4.	Analyze the profitability of a project in terms of environment.
5.	Identify the suitable measures and will be able to prepare a plan for rapid EIA.
6.	Create a plan for environmental impact of a development project.

Detailed Contents:

Part-A

Introduction to EIA: Historical development of Environmental Impact Assessment (EIA). EIA in Project Cycle. Legal and Regulatory aspects in India. – Types and limitations of EIA – Cross sectorial issues and terms of reference in EIA – Public Participation in EIA. EIA Process screening –scoping- setting – analysis – mitigation (6 Hrs)

Components and methods for EIA: Matrices – Networks – Checklists – Connections and combinations of processes – Cost benefit analysis – Analysis of alternatives. (8 Hrs)

Part-B

Socio-economic impact Assessment: Definition, Social impact Assessment model and the planning process. Rationale and measurement for SIA variables, Relationship between social impacts and change in Community and Institutional arrangements. Individual and family level impacts. Communities in transition - neighbourhood and Community impacts. Selecting, testing and understanding significant social impacts. Mitigation and enhancement in social assessment. Environmental costing of Projects. (12 Hrs)

Environmental Management Plan - preparation, implementation, and review – Mitigation and Rehabilitation Plans – Policy and guidelines for planning and monitoring programs – Post Project audit – Ethical and Quality aspects of Environmental Impact Assessment (6 Hrs)

Environmental Protection Act: The EPA, The Water Act, The Air Act, Case Studies, and preparation of environmental impact assessment statement for various industries. (4 Hrs)

TEXT BOOKS:

1. Canter, L.W., Environmental Impact Assessment, McGraw Hill, New York.1996
2. Environmental Impact Assessment, Barthwal, R. R. New Age International Publications.

Professor & Head
Civil Engg. Deptt.
Guru Nanak Dev Engg. College
Ludhiana.

REFERENCE BOOKS:

1. Lawrence, D.P., Environmental Impact Assessment – Practical solutions to current problems, Wiley-Interscience, New Jersey,2003.
2. World Bank –Source book on EIA
3. Petts, J., Handbook of Environmental Impact Assessment, Vol., I and II, Blackwell Science, London,1999.

Professor & Head
Civil Engg. Deptt.
Guru Nanak Dev Engg. College
Ludhiana.

PAGE ...2... OF ...2...

Subject Code : OECS-114

Subject Name: Cloud Computing-II

Programme: B.Tech (CSE)	**L:** 3 **T:** 0 **P:** 0
Semester: 7th	**Teaching Hours:** 36
Theory / Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design/Programming Problems:** 10%
External Marks: 60	**Duration of End Semester Exam (ESE) :** 3 hrs
Total Marks: 100	**Elective Status :** Open Elective

Additional Material Allowed in ESE: [NIL]

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1	Apply shared security model on Amazon Web Services (AWS) cloud implementation.
2	Apply automatic scaling in AWS cloud environments.
3	Host a static or dynamic website and use Lambda service on AWS cloud.
4	Use Artificial intelligence and Machine learning services on AWS cloud.
5	Make use of Internet of Things and Big Data products on AWS cloud.
6	Implement Blockchain technology using AWS cloud.

Detailed Contents:

Part-A

Amazon Web Services (AWS) Shared Security Model: Introduction to AWS security model for cloud services, Identity and access management (IAM), Principle of least privilege (PoLP), Denial of service (DoS), Distributed denial of service (DDoS), Watering hole attack, Multi-factor authentication (MFA), Amazon inspector, AWS trusted advisor, Amazon simple storage service (Amazon S3), Amazon elastic block store (Amazon EBS), Amazon relational database service (Amazon RDS)

[06]

Cloud Services, Instance States and Auto Scaling in Cloud Environments: Cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a

Head
Deptt. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

Service (SaaS). Amazon elastic compute cloud (Amazon EC2), EC2 instance states, AWS instance lifecycle, Instance store volumes, Amazon machine image (AMI), IPv4 address and IPv6 address, Elastic IP address, Automatic scaling in cloud environments, Auto scaling groups, Fleet, Launch template, Scale-out and Scale-in. **[7 hours]**

Dynamic Web Servers, Lambda and CloudFormation: Static website, Dynamic website, Amazon CloudFront, Content delivery network (CDN), Edge location, Origin, Distribution, Time to live (TTL), AWS Lambda, CloudFormation template, Infrastructure as code (IaC) **[5 hours]**

Part-B

Artificial Intelligence (AI) and Machine Learning (ML): Introduction to AI and ML, AWS DeepLens, AI services from AWS platform: Amazon Comprehend, Amazon Forecast, Amazon Lex, Amazon Personalize, Amazon Polly, Amazon Rekognition, Amazon Textract, Amazon Translate, Amazon Transcribe. Impact of AI, Deep learning, Reinforcement learning, Supervised learning, Unsupervised learning, Forecasting, Neural network, AWS machine learning applications. **[8 hours]**

Internet of Things (IoT) and Big Data: Introduction to IoT and Big data, AWS IoT services, Apache Hadoop, Big data processing cycle, Data analytics, AWS Big data applications and services. **[6 hours]**

Blockchain and Cryptocurrency: Introduction to blockchain technology, Cryptocurrency, Cryptocurrency mining, Decentralized database, Hash, Immutable transactions, Smart contract, AWS blockchain products. **[4 hours]**

Text Books:

1. Raj Kumar Buyya, James Broberg, Andrezei Goscinski, "Cloud Computing: Principles and Paradigms", First edition, John Wiley & Sons Inc.
2. Barrie Sosinsky, "Cloud Computing Bible", First edition, Wiley India Pvt. Ltd.

Reference Books:

1. John Rittinghouse, James F.Ransome, "Cloud Computing: Implementation, Management, and Security", International edition, CRC Press Taylor and Francis Group.
2. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper," Cloud Computing for Dummies", International edition, John Wiley & Sons Inc.

Books and online learning Material:

Head
Deptt. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

1 Best Practices for Security, Identity, & Compliance: https://aws.amazon.com/architecture/security-identity-compliance/ Accessed on July 21st, 2022.

2 Share an Amazon EBS Snapshot: https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ebs-modifying-snapshot-permissions.html Accessed on July 21st, 2022.

3 Sharing a DB Snapshot: https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_ShareSnapshot.html Accessed on July 21st, 2022.

4 Bucket Policies and User Policies: https://docs.aws.amazon.com/AmazonS3/latest/userguide/using-iam-policies.html Accessed on July 21st, 2022.

5 AWS Trusted Advisor for Everyone: https://aws.amazon.com/blogs/aws/trusted-advisor-console-basic/ Accessed on July 21st, 2022.

6 Understand the Instance Store and EBS: https://aws.amazon.com/premiumsupport/knowledge-center/instance-store-vs-ebs/ Accessed on July 21st, 2022.

7 Learn About Elastic IP Addresses: https://aws.amazon.com/premiumsupport/knowledge-center/intro-elastic-ip-addresses/ Accessed on July 21st, 2022.

8 https://aws.amazon.com/ec2/autoscaling/ Accessed on July 21st, 2022.

9 AWS Lambda FAQs https://aws.amazon.com/lambda/faqs/ Accessed on July 21st, 2022.

10 Explore AWS AI services https://aws.amazon.com/machine-learning/ai-services/ Accessed on July 21st, 2022.

11 AI with AWS Machine Learning https://aws.amazon.com/ai/ Accessed on July 21st, 2022.

12 https://aws.amazon.com/iot/ Accessed on July 21st, 2022.

13 https://aws.amazon.com/blogs/big-data/ Accessed on July 21st, 2022.

14 Blockchain on AWS https://aws.amazon.com/blockchain/ Accessed on July 21st, 2022.

Online Courses and Video Lectures

1 https://youtu.be/bSRTAMPqS3E Accessed on July 21st, 2022.

2 https://www.youtube.com/watch?v=PideBMIcwBQ Accessed on July 21st, 2022.

3 AWS Quick Start - Hosting a Static Website on AWS (Demo) video https://www.youtube.com/watch?v=BpFKnPae1oY Accessed on July 21st, 2022.

4 Getting Started with AWS - Build a Simple Static Website video https://www.youtube.com/watch?v=jHH-rN3y3Qc Accessed on July 21st, 2022.

5 Big Data on Amazon Web Services https://www.youtube.com/watch?v=3fkGCM0feC0&feature=youtu.be Accessed on July 21st, 2022.

6 Introduction to Blockchain on AWS" https://www.youtube.com/watch?v=oMzyZ49pykU accessed on July 21st, 2022.

7 What is Blockchain on AWS?" https://www.youtube.com/watch?v=9xbtq362Scs Accessed on July 21st, 2022.

Head
Deptt. of Computer Science & Engineering
Guru Nanak Dev Engineering College,
Gill Road, Ludhiana-141006 (Pb.)

Guru Nanak Dev Engineering College, Ludhiana

Department of Electronics and Communication Engineering
B. Tech. (Electronics and Communication Engineering)

Subject Code: OEEC-107
Subject Name: Fundamentals of Mechatronics

Programme: B.Tech.	**L:** 3 **T:** 0 **P:** 0
Semester: 8	**Teaching Hours:** L:39
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design Problems:** 10%
External Marks: 60	**Duration of End Semester Exam (ESE):** 3 hours
Total Marks: 100	**Elective Status:** Open Elective Course

Prerequisites: Basics of measurement and control systems.
Additional Material Allowed in ESE: Scientific calculator

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes	POs	PSOs
CO1	Discuss the components and applications of a mechatronics system.	1(2)	1(1), 3(1)
CO2	Explain the operational principle of various sensors and transducers and decide their role in various applications.	1(3), 2(2)	1(1)
CO3	Examine the role of pneumatic, hydraulic and electrical actuating systems in controlling various applications.	1(3), 2(3)	1(1)
CO4	Illustrate the functioning and applications of microcontrollers in mechatronic design.	1(3), 2(2)	1(1),3(2)
CO5	Develop ladder programs for a PLC involving logic functions, latching, internal relays and sequencing.	2(3), 3(1)	1(3)
CO6	Apply the concepts of Mechatronics in real world applications and engage in life-long learning.	1(3), 2(3), 3(3), 12(2)	1(2),3(3)

Detailed Contents:

Part A

Introduction: **4 hours**

Basic elements of Mechatronics system, Design Process, Traditional versus Mechatronics approach, Measurement systems, Overview of Control Systems, Applications of mechatronics systems.

Sensors and Transducers: **8 hours**

Performance Terminology, Displacement, Position and Proximity Sensors: Potentiometer, strain-gauge, capacitive, differential transformers, optical encoders, Pneumatic sensors, Proximity switches, and Hall-effect sensors. Velocity and motion sensors, Fluid pressure sensors, Temperature sensors, Light Sensors.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Electronics & Communication Engg.
Guru Nanak Dev Engineering College
LUDHIANA-141 006

Actuators: **7 hours**

Pneumatic and Hydraulic systems, Directional Control Valves, Pressure control valves, Rotary actuator. Electrical Actuation systems: Solid-State Switches, Solenoids, Stepper Motors.

Part-B

Microcontrollers: **7 hours**

Numbering Systems, Microcontrollers: Block diagram and functioning, PIC Microcontroller, Applications: Temperature Measurement System, Domestic Washing Machine.

Programmable Logic Controllers: **7 hours**

Basic PLC structure, Input/Output Processing, Ladder Programming, Instruction Lists, Latching and Internal relays, Sequencing, Timers and Counters.

Mechatronic Systems: **6 hours**

Mechatronic Designs, Case studies of mechatronic systems-A Pick-and-Place Robot, Car Park Barriers, Digital Camera, Bar Code Reader.

Text Books:

1. William Bolton, "Mechatronics", Pearson Education, Sixth Edition, 2015.
2. Godfrey C. Onwubolu, "Mechatronics: Principles and Applications", Elsevier, First Edition, 2005.

Reference books and other resources:

1. David G. Alciatore, Michael B. Histand, "Introduction to Mechatronics and Measurement Systems", McGraw Hill, Fourth Edition, 2012.
2. K.P. Ramachandran, G.K.Vijayaraghavan, M.S. Balasundaram, "Mechatronics", John Wiley & Sons, First Edition, 2008.
3. Devdas Shetty, Richard A. Kolk, "Mechatronics System Design", Cengage Learning, Second Edition, 2011.
4. Musa Jouaneh, "Fundamentals of Mechatronics", Cengage Learning, 2013.

E books and online learning materials:

1. https://ieeexplore.ieee.org/abstract/document/7827930
2. https://www.sciencedirect.com/science/article/abs/pii/S0967066102000163

MOOCS and Video Course:

1. https://nptel.ac.in/courses/112/103/112103174/
2. https://nptel.ac.in/courses/112/107/112107298/

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Head of Deptt.
Electronics & Comm. Engg.
Guru Nanak Dev Engg. College
Ludhiana-141006

Subject Code: OEME-112

Subject Name: Entrepreneurship Practices

Programme: B.Tech	**L:3 T:0 P:0**
Semester :6/7/8	**Teaching Hours: 36hrs**
Theory/Practical: Theory	**Credits:03**
Internal Marks:40	**Percentage of Numerical/design/programming problems: 10%**
External Marks:60	**Duration of End Semester exam(ESE):03hours**
Total Marks:100	**Elective Status: Open**

Prerequisites: Nil

Additional Material allowed in ESE: Nil

On completion of the course, the student will have ability to:

CO#	Course Outcomes
1	Comprehend the problems and find a business opportunity
2	Devise strategies for different types of markets
3	Present the value proposition and compete in market
4	Build a Minimum viable product
5	Understand intricacies of financials in business
6	Present his pitch deck

Part-A

Unit 1: Basics of Entrepreneurship **07 hours**

Problem Identification and Opportunity Discovery: Conduct Opportunity Discovery, Problem Validation, Sharpen the Problem Pitch

Customer and Markets: Identify the Market Type, Explore Market Segment; Determine Market Positioning, Create Customer Persona

Unit2: Value Proposition & Competition **07 hours**

Create a Compelling Value Proposition: Craft your core value proposition, Create Sustainable Differentiation Strategy, Deliver Value

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Prof. & Head
Mech. & Prod Engg. Deptt
Guru Nanak Dev. Engg. College,
LUDHIANA

Competitive Advantage: Identify competitors, Identify critical product features, Conduct Feature ranking

Unit3: Business Models **07 hours**

Business Model: Build and test a business model, Pivot or Persevere, Identify the riskiest assumptions.

Build your MVP: Build your prototype, Test with early adopters, Conduct Customer Interviews, Refine the Prototype, Build Minimum Viable Product

Part-B

Unit 4:Finance in Business **07 hours**

Financial Feasibility: Ascertain Costs, Arrive at appropriate pricing strategy, Financial Projections, Key Financial Metrics

Go To market Strategy: Identify the appropriate channels, Build Strategic partnerships, Devise a Market penetration strategy

Unit 5: Growth & Funding **08 hours**

Managing growth and Targeting Scale: Growth Plan Structure for the Scaling Strategy Customer acquisition;Enhancing productivity,Process improvements,Operational excellence,Manage money

Funding Strategy: Sources of funding and uses of Funds Statement, Map the Start-up Lifecycle to Funding Options; Valuation Create the Pitch Deck

Books & Resources:

All Resources will be provided by Wadhwani Foundation

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

Prof. & Head
Mech. & Prod. Engg. Deptt.
Guru Nanak Dev. Engg. College
LUDHIANA

Subject Code: OEEE-109
Subject Name: *Electric Vehicles*

Programme: B.Tech (EE)	**L: 3 T: 0: P: 0**
Semester:8	**Teaching Hours:** 36L
Theory/Practical: Theory	**Credits:**3
Internal marks:40	**Percentage of Numerical/Design/ Programming Problems:**40%
External Marks:60	**Duration of End Semester exam (ESE):**3 hr
Total marks:100	**Elective Status:** Open Elective

Prerequisites: Basic Electrical Engineering

Additional Material allowed in ESE: Scientific Calculator

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes (CO)
1.	Understand the development of Electric Vehicles and available technologies
2.	Comprehend environmental and economic impact of electric vehicles
3.	Appreciate the concept of Electric Traction
4.	Select a suitable drive scheme for developing an electric vehicle
5.	Acquaint with different possible ways of energy storage
6.	Appreciate various charging technologies for Electric Vehicles

DETAILED CONTENTS

PART-A

Introduction *(06L)*

Electric vehicles (EV) development, past, present and future, comparison with IC engine drive vehicles, Configuration of Electric Vehicle, social and environmental importance of Electric Vehicles

Electric Drive Trains *(06L)*

Basic concept of electric traction, introduction to various electric drive train topologies, power flow control in electric drive train topologies, fuel efficiency analysis

Electric Propulsion Unit *(06L)*

Different types of motors used in EV and their torque-speed characteristics, motor control techniques, sensor-less control, drive system efficiency

PART-B

Energy Storage *(09L)*

Introduction to Energy Storage Requirements in Electric Vehicles, Battery based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Sizing power electronic devices for energy storage, Regenerative Braking, Cooling System

Charging System Technology for Electric Vehicles *(09L)*

Charging of EV in 3 Levels, Onboard Charger: Single stage, two stage, Multifunctional, Integrated, Multifunctional. Off-board Charger: Bidirectional &Unidirectional AC/DC convertors, Bidirectional & Unidirectional DC/DC convertors, Fast Charging Stations, Charging Methods: Constant Current-Constant Voltage (CC-CV), Five step charging pattern, Pulse Charging Method
Case Study: Design of Battery Electric Vehicle (BEV)

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006

H.O.D.
Deptt. of Electrical Engineering
G.N.D. Engineering College,
Ludhiana-141 006.

Text/References

1. C. Mi, M. A. Masrur and D. W. Gao, "Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives", John Wiley & Sons, 2011.
2. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, " Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design", CRC Press, 2004.
3. T. Denton, "Electric and Hybrid Vehicles" , Routledge, 2016.

E-Books and Online Learning Material

1. https://nptel.ac.in/courses/108/103/108103009/
2. https://nptel.ac.in/courses/108/106/108106170/
3. http://ceb.ac.in/knowledge-center/E-BOOKS/Modern%20Electric,%20Hybrid%20Electric%20&%20Fuel%20Cell%20Vehicles%20-%20Mehrdad%20Ehsani.pdf
4. https://www.routledge.com/rsc/downloads/CRC_Hybrid_Vehicles_Freebook.pdf
5. https://books.google.co.in/books?id=bQFuTCGNYWgC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
6. https://link.springer.com/content/pdf/10.1007/s42835-020-00547-x.pdf

H.O.D.
Deptt. of Electrical Engineering
G.N.D. Engineering College,
Ludhiana-141 006.

Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006