#### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (AN AUTONOMOUS INSTITUTION)



(AN AUTONOMOUS INSTITUTION)
Pampady, Thiruvilwamala, Thrissur Dt., Kerala - 680588
NBA Accredited Programmes - B.Tech CSE, B.Tech MTR | NAAC Re-accredited with 'A' Grade
Recognized by UGC under Section(2f) of the UGC Act, 1956 | ISO 9001:2015 Certified
Approved by AICTE | Affiliated to APJ Abdul Kalam Technological University







#### **AQAR**

#### AY 2023-24

- 1.2.2 Number of Add on /Certificate programs offered during the year
- 1.2.3 Number of students enrolled in Certificate/ Add-On programs as against the total number of students during the year

Sl. No.	Description	Page No.
1	ADD – ON Details of Dept. of CSE (Request Letter, Circular, Course Syllabus, Attendance Report, Exam Details and Certificates – Samples)	1
2	ADD – ON Details of Dept. of ECE	51
3	ADD – ON Details of Dept. of EEE	80
4	ADD – ON Details of Dept. of ME	128
5	ADD – ON Details of Dept. of MTR	157
6	ADD – ON Details of Dept. of MBA	209
7	ADD – ON Details of Dept. of MCA	214



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#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

#### Minutes of Department Advisory Committee Meeting held on 11.09.2023

#### AY 2023-24

A meeting of the Department Advisory Committee (DAC) was held on 11.09.2023 at 10:00 AM in the chamber of HOD, Dept. of CSE

The following members were present

- 1. Dr. Mredhula L (HOD, ECE\_
- 2. Ms. Silja Varghese, HoD In Charge CSE
- 3. Mr. Vipin KM, Assistant Professor CSE
- 4. Ms. Sruthy MR, Assistant Professor CSE
- 5. Ms. Baby V, Assistant Professor CSE
- 6. Ms. Praveena K, Assistant Professor CSE
- 7. Ms. Smita Unnikrishnan, Assistant Professor CSE
- 8. Ms. Betsy Joy, Assistant Professor CSE

The following decisions were taken:

1. Decision was made to give practical knowledge to students in recent technologies. It was decided to conduct an ADD ON courses for ALL Semester B.Tech CSE starting from 18.09.2023 for 30 hours.

Sl. No.	Semester	Course Code and Course Name
1	ALL	VAC-CRYPTOGRAPHY AND BLOCKCHAIN TECHNOLOGIES

- 2. The course will be conducted during the allotted hours for ADD-ON course in the timetable. Students must register before 15.09.2023.
- 3. Staff Advisors of respective classes should ensure maximum participation and monitor the attendance.

The meeting came to an end at 10:30 AM

HOD, CSE

Nehru College of Engineering and Research Centre (Autonomous) Nila Gargeas, Pampady

Thiruvilwamaia, Thrissur - 680688



(AN AUTONOMOUS INSTITUTION)

Pampady, Thiruvilwamala, Thirlawr DL, Kerala 080588

NBA Accredited Programme - B. Tech CSB, B. Pech MTRI NAAC Ite-accredited with 'A' Grade

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Nehru College of Engineering and Research Centre (Autonomous)

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From

CSE department, NCERC Pampady

TO

The Principal NCERC Pampady

SUBJECT: Request for Conducting a Certificate Course, Reg.

Respected Sir,

Students need a deep understanding of upcoming methodologies to enhance the knowledge. So, computer science and engineering department would like to conduct a certificate course for all students. It will be a 30-hour course scheduled for this academic year 2023-2024. Kindly request you to give the permission for the same. The list of course name and course handling faculties are listed below. The syllabus of the individual course is attached for the reference.

Thank you for your consideration. I look forward for your response soon.

- 1			
	SEMESTER	BATCH	COURSE NAME
			CRYPTOGRAPHY AND
	ALL	A,B	BLOCKCHAIN
			TECHNOLOGIES



Yours Sincerely,

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

#### ADMISSION TO ADD-ON-COURSE (2023-24)

Applications are invited for admission for the Add-on Course 'CRYPTOGRAPHY AND BLOCKCHAIN TECHNOLOGY' offered by the Department of Computer Science and Engineering, Nehru College of Engineering and Research Centre, Pampady, Thrissur.

#### Eligibility Criteria:

All Year UG Engineering students of CSE department are eligible. Interested students can give their names to respective class advisors on or before 10-09-2023.

#### Timing:

1 hour per day for 30 days. Saturday may be used at the discretion of the Department.

#### Attendance:

A minimum of 75% attendance is required for writing the examination.

#### **Important Dates:**

CommencementofClasses:18-09-2023

Examination Date: 25-04-2024

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Research Centre (Autonomous)
Nila Gardeas, Pampady
Thiruvilwamala, Thrissur - 680588

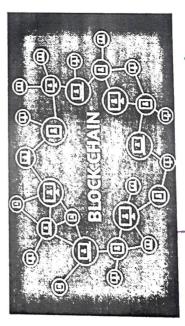
#### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC "A"Accredited) (Approved by AICTE, Affiliated to APJ Abdul Kalam

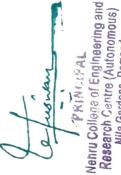
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

#### ADD ON COURSE

#### O





#### About Cryptography and blockchain technology

Cryptography is a way of securing data against unauthorized access. In the blockchain, cryptography is used to secure transactions between two nodes in the blockchain network. As mentioned above, there are two main concepts in blockchain – cryptography and hashing. Cryptography encrypts messages in the P2P network while hashing helps secure block information and link blocks in the blockchain.

#### Objective

The purpose of this course is to create awareness and understanding among students on the foundation of blockchain technology. The course introduces the cryptographic principles behind blockchain and helps the students understand concepts like consensus, crypto-currency, smart contracts, use cases etc. The course enables students to develop simple decentralize applications using blockchain networks such as Ethereum.

#### Important Dates:

Commencement of Classes:18-09-2023

Examination Date: 25-04-2024

#### Cordinator:

#### Asst Prof. Leya M S

Dept. of Computer Science & Engineering, NCERC-Pambady

Mob. No.: +918078381995

Email: leya3945@ncerc.ac.in

Website: www.ncerc.ac.in

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Email: principal.ncerc.ac.in

COURSE NAME: CRYPTOGRAPHY ATTENDANCE REGISTER OF ADD ON COURSE (2023 - 2024)

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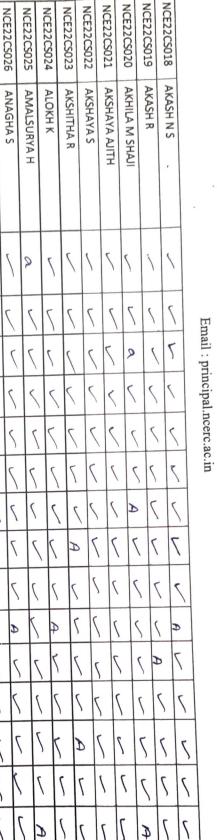
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ATTENDANCE REGISTER OF ADD ON COURSE (2023 - 2024)

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CLASS:

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CSE

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COURSE NAME: CRYPTOGRAPHY AND BLOCKCHAIN
TECHNOLOGIES

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ATTENDANCE REGISTER OF ADD ON COURSE (2023 - 2024)

CLASS:

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CRYPTOGRAPHY AND BLOCKCHAIN TECHNOLOGIES

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CLASS:

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CRYPTOGRAPHY TECHNOLOGIES AND BLOCKCHAIN

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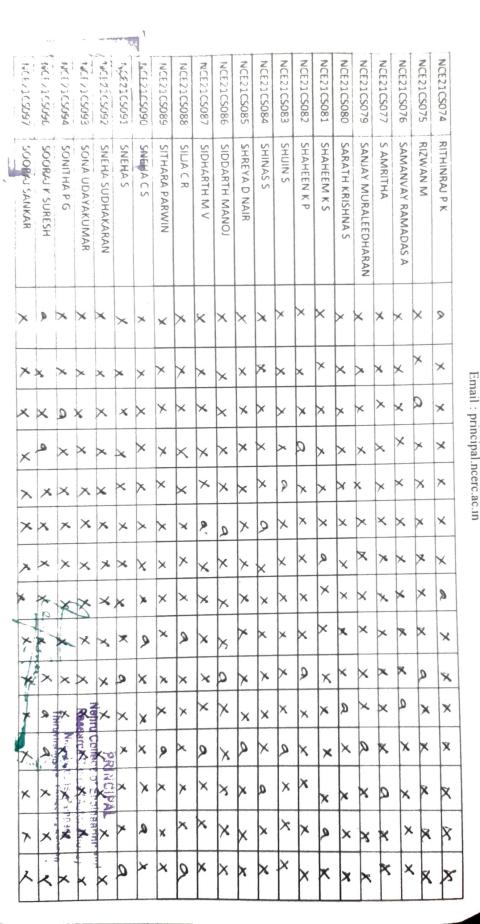
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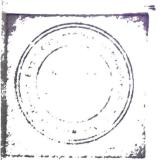


### VALUE ADDED COURSE SYLLABUS

### SUBJECT: CRYPTOGRAPHY AND BLOCKCHAIN TECHNOLOGY

SL NO	TOTIC	TOTAL NO. OF HOURS	WEIGHTAG E OF MARKS (IN %)	
I	Introduction to Cryptography, Symmetric cryptography – AES. Asymmetric cryptography – RSA. Elliptic curve cryptography, Digital signatures – RSA digital signature algorithms. Secure  Hash Algorithms – SHA-256. Applications of cryptographic hash functions – Merkle trees, Distributed hash tables.	10	30° 0	
П	Blockchain – Definition, architecture, elements of blockchain, benefits and limitations, types of blockchain. Consensus – definition, types, consensus in blockchain.  Decentralization – Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Blockchain and full ecosystem decentralization.	10	30%	
Ш	Consensus Algorithms, Crash fault-tolerance (CFT) algorithms – Paxos, Raft. Byzantine facilitolerance (BFT) algorithms – Practical Byzantine Fault Tolerance (PBFT), Proof of york (PoW),	10	40%	
1	proof of stake (PoS), Types of PoS. Stcoin - Definition, Cryptographic keys - rivate keys, public keys, addresses.	Noha	PRINCIPAL	
		N	offege of Engine ICh Centre (Auton ils Gardens, Pampa Iwamala, Thrissur	(suomous)

	the first the fi
- Constitution	Transactions -
	Lifecycle, coinbase transactions, transaction
-	validation. Blockchain – The genesis block
Apple - Apple	Mining – Tasks of miners, mining algorithm,
- Charles	hash rate. Wallets – Types of wallets.



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### ADD-ON EXAMINATION

11 010 0110 111 111 111 111 111 111 111			technology
that makes the records of any digital asset	transparent	and	
unchangeable.			

- A. Decentralized
- B. Demanding
- C. Secure
- D. Popular
- 2. Blockchain networks are much \_\_\_\_ and deal with no real single point of failure.
  - A. Simpler
  - B. Easier to scale
  - C Convenient
  - D. Faster
- 3. Bitcoin is a cryptocurrency, which is an application of Blockchain.
  - A. True
  - B. False
- 4. What does P2P stand for?
  - A Peer to Peer
  - B. Product to Product
  - C. Password to Password
  - D. None of the above
- 5. Did Blockchain enable a centralized or a decentralized system for the exchange of value?
  - A. Decentralized
  - B. Centralized
  - C. None of the above
  - D. Can't say

6. What is Blockchain?

A. A currency

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8. Smart Contract characteristics do not include:	
<ul><li>A. Alterable</li><li>B. Fast and cost-effective</li><li>C. A high degree of accuracy</li><li>D. Transparency</li></ul>	
9. Which of the following is not a type of symmetric-ke technique?	ey cryptography
<ul> <li>a. Caesar cipher</li> <li>b. Data Encryption Standard (DES)</li> <li>c. Diffie Hellman cipher</li> <li>d. Playfair cipher</li> </ul>	
10. Blockchain has versions.	
A. 2 B. 3 C. 4 D. 5	
11. Who introduced the digital online cryptocurrency	known as Bitcoin?
A. Satoshi Nakamoto B. Nick Szabo C. Wei Dai D. Hal Finney  22. Vihat dong a block in a Blockchain have?	PRINCIPAL Nehru College of Engineering and Research Centre (Autonomous) Nila Gardena, Pampady Thiruvilwamaia, Thrissur - 680888

B. A ledger

A. Private B. Public

C. A type of currency

C. Public Permissioned

D. Permissioned

D. A distributed ledger on a peer-to-peer network

7. Bitcoin is based on \_\_\_\_\_ blockchain.

- A. Header & Digital ledger
- B. Bitcoins & Input
- C. Transactions & Bitcoins
- D. Header & Transaction

### 13. Smart Contract characteristics do not include:

- A. Alterable
- B. Fast and cost-effective
- C. A high degree of accuracy
- D. Transparency

### 14. The transaction Merkle Tree root value in a Bitcoin block is calculated using,

- A. Hash of transactions
- B. Previous block's hash
- C. Number of transactions
- D. None of the above

### 15. What is a DApp?

- A. A type of cryptocurrency
- B. A condiment
- C. A type of blockchain
- D. A decentralized application

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Thiruvilwamata, Thrisau.

### ANSWER KEY

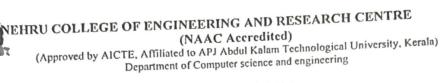
- A) Decentralized
- B) Lasier to scale
- 31 A) True
- A) Peer to Peer
- Al Decentralized
- D' A distributed ledger on a peer-to-peer not a 6
- B) Public
- A) Alterable
- 9) c) Diffie Hellman ciphei
- 10) 6) 3
- 11) Al Satoshi Nakamoto
- 12) D) Header & Transaction
- 13) D) All the above
- 14) Al Hash of transactions
- 15) D) A decentralized application

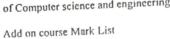
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	NCE20CS002	ABHIJITH GIRISH K	26 / 30	-
2	NCE20CS003	ABHILASH H	26 / 30	-
3	NCE20CS004	ABIJITH S	27 / 30	_
4	NCE20CS005	ADARSH P K	28 / 30	_
5	NCE20CS006	ADITHYA	30 / 30	-
6	NCE20CS007	ADITHYAN V	30 / 30	
7	NCE20CS008	ADITYA P	26 / 30	-
8	NCE20CS009	AJAY KRISHNA C S	24 / 30	
9	NCE20CS010	AJAY P	24 / 30	
10	NCE20CS011	AKASH S	29 / 30	4
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12	NCE20CS013	AKSHAY KRISHNAN K M	28 / 30	_
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16	NCE20CS017	ANAND M	28 / 30	
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18	NCE20CS019	ANASWARA C	29 / 30	
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21	NCE20CS022	ANIRUDHAN P M	26 / 30	
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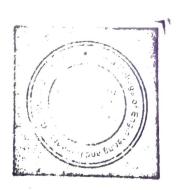
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Department of Computer science and engineering

Add on course Mark List

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30	NCE20CS032	ASHVIN SIBI	26 / 30
33	NCE20CS033	ASHWIN C	25 / 30
34	NCE20CS034	ASHWIN MOHAN	26 / 30
35	NCE20CS035	ASWATHI K M	28 / 30
36	NCE20CS036	ASWATH V	21 / 30
37	NCE20CS037	ASWINDAS C H	27 / 30
38	NCE20CS038	AVINASH M P	26 / 30
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43	NCE20CS043	DEEPAK K	25 / 30
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### **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### Minutes of Department Advisory Committee Meeting held on 08.09.2023

### AY 2023-24 | ODD Semester

A meeting of the Department Advisory Committee (DAC) was held on 08.09.2023 at 3:00 PM in the chamber of HOD, Dept. of ECE.

The following members were present

- Dr. Mredhula L (HOD, ECE\_
- 2. Ms. Sajitha A S (Asst. Professor, ECE)
- 3. Ms. Kiran M (Asst. Professor, ECE)
- 4. Mr. Rajkumar P (Asst. Professor, ECE)
- 5. Mr. Vishnu Prabha N Kaimal (Asst. Professor, ECE)
- 6. Ms. Lisa C (Asst. Professor, ECE)
- 7. Ms. Anooja B (Asst. Professor, ECE)
- 8. Ms. Rachel Stefna Angeline A (Asst. Professor, ECE)

The following decisions were taken:

1. Decision was made to give practical knowledge to students in recent technologies. It was decided to conduct an ADD ON courses for ODD Semester B.Tech ECE starting from 18.09.2023 for 30 hours.

Sl. No.	Semester	Course Code and Course Name	Course Coordinator
1	I	VAC-S1 Arduino using TINKER CAD	Ms. Anooja B
2	III	VAC-S3 Familiarization of Verilog/VHDL	Mr. Vishnu Prabha N Kaimal
3	V	VAC-S5 Internet of Things	Ms. Sajitha A S
4	VII	VAC-S7 Raspberry Pi	Mr. Vysak Valsan

- 2. The course will be conducted during the allotted hours for ADD-ON course in the timetable. Students must register before 15.09.2023.
- 3. Staff Advisors of respective classes should ensure maximum participation and monitor the attendance.

The meeting came to an end at 3:50 PM

Nehru College of Engineering and Research Centre (Autonomous)

Nila Gardans, Pampady Thiruvilwamala, Thrissur - 680588 HOD, ECE







### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### Minutes of Department Advisory Committee Meeting held on 15.01.2024

### AY 2023-24 | EVEN Semester

A meeting of the Department Advisory Committee (DAC) was held on 15.01.2024 at 10:00 AM in the chamber of HOD, Dept. of ECE.

The following members were present

- 1. Dr. Mredhula L (HOD, ECE
- 2. Mr. Jithin Jose Kallada (Asst. Professor, ECE)
- 3. Ms. Kiran M (Asst. Professor, ECE)
- 4. Mr. Rajkumar P (Asst. Professor, ECE)
- 5. Mr. Vishnu Prabha N Kaimal (Asst. Professor, ECE)
- 6. Ms. Lisa C (Asst. Professor, ECE)
- 7. Ms. Anooja B (Asst. Professor, ECE)
- 8. Ms. Rachel Stefna Angeline A (Asst. Professor, ECE)

The following decisions were taken:

Decision was made to give practical knowledge to students in recent technologies. It
was decided to conduct an ADD ON courses for EVEN Semester B. Tech ECE starting
from 29.01.2024 for 30 hours.

Sl. No.	Semester	Course Code and Course Name	Course Coordinator
1	II	VAC-S2 Foundations of Python	Ms. Rachel Stefna Angeline A
2	IV	VAC-S4 Logic Design using Virtual Lab	Mr. Rajkumar P
3	VΙ	VAC-S6 Foundations of Data Science	Mr. Vysak Valsan
4	VIII	VAC-S8 VLSI using Virtual Lab	Ms. Lisa C

- 2. The course will be conducted during the allotted hours for ADD-ON course in the timetable. Students must register before 26.01.2024.
- 3. Staff Advisors of respective classes should ensure maximum participation and monitor the attendance.

The meeting came to an end at 10:30 AM

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HOD, ECE

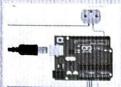
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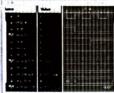
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Department of Electronics & Communication Engineering AY 2023-2024 | Odd Semester | B.Tech Add On Course Registration



Course: VAC-51 Arduino using TINKER CAD Semester: 1



Course: VAC-S3 Familiarization of VNDL / Verling



Last Date: 15.09.2023 Classes Starts from

18.09.2023. Contact Class Advisor for More Information



Course: VAC-S5 lot Semester: Y



Semester: VII





### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

Department of Electronics & Communication Engineering AY 2023-2024 | Even Semester | B.Tech Add On Course Registration



of Python



Course: VAC-S4 Logic Design using Virtual Lab Semester: VI







Last Date: 26.01.2024



Course: VAC-S8 VLSI Lab through YL Semester: VM





Course: VAC-S6 Foundations of Data Science Semester: VI



Nehru College of Engineering and Research Centre (Autonomous) Nila Gardans, Pampady Thiruvilwamala, Thrissur - 680598



From,

Vysak Valsan Asst. Professor, Dept. of ECE NCERC

To,

The Principal NCERC

Through: Head of the Department, ECE, NCERC

Subject: Request to Conduct ADD ON Course VAC-S6 Foundations of Data Science for B. Tech ECE VI Semester Students (AY 2023-24)

Respected Sir,

The Department of Electronics and Communication Engineering is planning to conduct 30 hours ADD ON VAC-S6 course on "Foundations of Data Science", for the VI Semester, B. Tech ECE students during the academic year 2023-2024. The course is intended to be beneficial for students in their academics and for their career.

I request you to kindly grant permission for the same.

ENGINEERIA

Thanks,

Vysak Valsan

Asst. Professor,

Dept. of ECE, NCERC

Forwarded to Principal

HOD, ECE

Pampady 15.01.2024

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### <u>ADMISSION NOTIFICATION FOR ADD ON COURSE FOR B. TECH ECE</u>

AY 2023-24 | EVEN SEMESTER

16.01.2024

Applications are invited for admission from VI Semester B. Tech ECE students for the Add-On Course VAC-S6 Foundations of Data Science offered by the Department of Electronics & Communication Engineering, Nehru College of Engineering and Research Centre (Autonomous).

Last Date for Registration: 26.01.2024

Scan to Register:



**Examination Eligibility - Attendance:** 

A minimum of 75% attendance is required for writing the examination.

THRISSUM OT.

**Important Dates:** 

Commencement of Classes: 29.01.2024

Examination Date: 06.05.2024

**COURSE COORDINATOR** 

HOD, ECE

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### ADD ON COURSE

### VI Semester B. Tech ECE (2021-25 Batch)

ADD ON: VAC-S6 Foundations of Data Science

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the basics of machine learning and different types.
CO 2	Differentiate regression and classification, and non-metric methods
CO3	Apply statistical methods in non-linear classification and neural networks
CO 4	Understand the basics of unsupervised learning and ensemble methods
CO 5	Understand the basics of deep learning networks, convolutional neural networks

### Module 1 (6 Hours)

Basics of machine learning, supervised and unsupervised learning, examples, features, feature vector, training set, target vector, test set, over-fitting, curse of dimensionality. Evaluation and model selection: ROC curves, evaluation measures, validation set, bias-variance trade-off, confusion matrix, recall, precision, accuracy.

### Module 2 (6 Hours)

Regression: linear regression, error functions in regression, multivariate regression, regression applications, bias and variance, Classification: Bayes' decision theory, discriminant functions and decision surfaces, Bayesian classification for normal distributions, classification applications.

### Module 3 (6 Hours)

Linear discriminant based algorithm: perceptron, perceptron algorithm, support vector machines. Nonlinear classifiers, the XOR problem, multilayer perceptron, backpropagation algorithm.

### Module 4 (6 Hours)

Unsupervised learning: Clustering, examples, criterion functions for clustering, proximity measures, algorithms for clustering. Ensemble methods: boosting, bagging. Basics of decision trees, random forest, examples.

### Module 5 (6 Hours)

Introduction to deep learning networks, deep feedforward networks, basics of convolutional neural networks (CNN) CNN basic structure, Hyper-parameter tuning, Regularization - Dropouts. Initialization, CNN examples

### Reference Books

- 1. Bishop, C. M. "Pattern Recognition and Machine Learning" Springer, New York, 2006.
- Theodoridis, S. and Koutroumbas, K. "Pattern Recognition". Academic Press, San Diego. 2003.
- 3. Hastie, T., Tibshirani, R. and Friedman, J. "The Elements of Statistical Learning". Springer.
- 4. Ian Goodfellow, Yoshua Bengio, Aaron Courville. "Deep Learning" MIT Press, 2016.

5. Duda, R.O., Hart, P.E., and Stork, D.G. "Pattern Classification". Wiley, New York,

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Thirmilwamala, Thrissur - 680590



### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

# ADD-ON COURSE - VAC S6 POUNDATIONS OF DATA SCIENCE LATTENDANCE SHEET | 24,04,2024

AY 2023-24 | EVEN SEMESTER

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### **S6 Add-On Course Foundations of Data Science**

Test Paper (B.Tech ECE 2021-25) AY: 2023-24 | Test Date: 06.05.2024

### Section A: Basics of Machine Learning

- 1. What is the primary difference between supervised and unsupervised learning?
- a) Supervised learning uses labeled data, while unsupervised learning uses unlabeled data.
- b) Supervised learning is faster than unsupervised learning.
- c) Unsupervised learning works only on large datasets.
- d) Supervised learning uses data with missing values.
- 2. In supervised learning, what is the "target vector"?
- a) A collection of input data points.
- b) A set of features used for prediction.
- c) The vector containing the correct output values corresponding to each input in the training
- d) The vector of predicted output values.
- 3. Which of the following is an example of unsupervised learning?
- a) Linear regression
- b) Decision tree classification
- c) K-means clustering
- d) Support vector machines

### Section B: Model Evaluation and Objectives

- 4. Which of the following measures helps to evaluate the trade-off between sensitivity (recall) and specificity in a binary classification model?
- a) Accuracy
- b) Confusion matrix
- c) ROC curve
- d) F1 score
- 5. What is a feature vector in machine learning?
- a) A vector of weights learned by the model.
- b) A vector containing the true labels of the training set.

c) A vector containing input data points, representing the values of features for a particular hrissur - 680588 instance.

d) The set of evaluation metrics for model performance.

6. What is the main objective of linear regression?

a) To minimize the correlation between variables.

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Page 1 of 5





- b) To find a relationship between a dependent variable and one or more independent variables.
- c) To classify data into different categories.
- d) To calculate the distance between data points.

### Section C: Regression and Model Performance

- 7. What is the purpose of the error (loss) function in regression?
- a) To optimize the classification accuracy.
- b) To measure the difference between predicted and actual values.
- c) To normalize the input data.
- d) To calculate the gradient in linear regression.
- 8. In multivariate regression, the dependent variable is:
- a) A single scalar value.
- b) A vector with multiple values.
- c) Always binary.
- d) None of the above.
- 9. Which of the following is an example of an application of regression?
- a) Image classification
- b) Predicting house prices
- c) Grouping similar objects together
- d) Recommending movies to users

### Section D: Bias, Variance, and Bayes' Theorem

- 10. Bias in a machine learning model typically leads to:
- a) Overfitting the training data
- b) Underfitting the training data
- c) A perfectly fitted model
- d) Random fluctuations in the predictions
- 11. Bayes' decision theory is used in classification to:
- a) Minimize the regression error
- b) Find the boundary between two classes
- c) Maximize the likelihood of a given observation
- d) Measure the bias of a model

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12. In Bayesian classification for normal distributions, the discriminant function:

- a) Determines the decision boundary between classes
- b) Measures the bias in the classifier
- c) Predicts the regression coefficient
- d) Identifies the highest variance in the data

Section E: Support Vector Machines and Perceptrons

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### 13. What is the primary purpose of the perceptron algorithm?

- a) To minimize the error in regression tasks
- b) To classify linearly separable data
- c) To maximize the margin between classes
- d) To perform dimensionality reduction

### 14. In the context of support vector machines (SVM), the term "margin" refers to:

- a) The distance between the support vectors and the hyperplane
- b) The maximum error allowed in predictions
- c) The dimensionality of the feature space
- d) The total number of support vectors used in classification

### 15. The XOR problem is often cited as a challenge for:

- a) Linear classifiers
- b) Logistic regression
- c) Support vector machines
- d) Decision trees

### Section F: Deep Learning and Neural Networks

### 16. Which of the following best describes a multilayer perceptron (MLP)?

- a) A single-layer network that can only solve linearly separable problems
- b) A network that uses multiple perceptrons in a single layer
- c) A type of neural network with one or more hidden layers
- d) A network that does not use activation functions

### 17. What is the primary function of the backpropagation algorithm?

- a) To initialize weights in a neural network
- b) To propagate the error backward through the network and update weights
- c) To compute the activation functions for neurons
- d) To classify the input data into categories

### 18. In a nonlinear classifier, the goal is to:

- a) Create a linear boundary between classes
- b) Map input features into a higher-dimensional space for separation
- c) Use only one layer of neurons
- d) Limit the number of support vectors

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### Section G: Clustering and Dimensionality Reduction

- 19. What is the primary objective of clustering in unsupervised learning?

  a) To predict a target variable
- b) To group similar data points together based on features
- c) To reduce the dimensionality of the data
- d) To find the best decision boundary between classes

20. Which of the following is a commonly used proximity measure for clustering?

a) Mean squared error

Page 3 of 5







- c) Cross-entropy
- d) R-squared

### 21. In clustering, the criterion function often used to evaluate the quality of clusters is:

- a) Sum of squared distances within clusters
- b) Total prediction error
- c) The F1 score
- d) Confusion matrix

### Section H: Advanced Topics in Machine Learning

### 22. Boosting is an ensemble method that:

- a) Combines weak classifiers into a strong classifier by focusing on errors of previous classifiers
- b) Averages predictions from multiple classifiers to reduce variance
- c) Relies solely on a single model for predictions
- d) Uses bagging techniques to create bootstrapped datasets

### 23. Random forests improve upon decision trees by:

- a) Using only a single decision tree to make predictions
- b) Combining predictions from multiple decision trees to reduce overfitting
- c) Limiting the depth of each tree to a maximum of two levels
- d) Using a linear regression model instead of decision trees

### 24. What is the primary function of deep feedforward networks in deep learning?

a) To classify input data based on proximity measures

- b) To map input features to output through multiple layers of neurons
- c) To perform clustering on large datasets
- d) To reduce the dimensionality of the input data

### Section I: Applications and Regularization

Nebru College of Engineering and 25. In a Convolutional Neural Network (CNN), what is the main role of theearch Centre (Autonomous) convolutional layer? Nila Gardens, Pampady Thiruvilwamala, Thrissur - 680588

a) To reduce the number of parameters using max pooling

- b) To detect features such as edges and textures in the input image
- c) To perform classification based on the input features
- d) To normalize the data before feeding it into the network

26. Which of the following is a hyper-parameter in deep learning networks that requires tuning?

- a) Number of epochs
- b) Training data size
- c) Mean squared error
- d) Output layer size



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### 27. What is the primary purpose of using dropouts as a regularization technique in deep learning?

- a) To enhance the learning rate
- b) To prevent overfitting by randomly dropping neurons during training
- c) To decrease the complexity of the neural network
- d) To ensure all neurons are trained equally

### 28. What happens during weight initialization in deep learning networks?

- a) Initial weights are set to random values before training starts
- b) Weights are updated using backpropagation
- c) Weights are initialized to zero for faster convergence
- d) Initial weights are set to the mean of the dataset

### 29. Which of the following is a common example of CNN application?

- a) Recommender systems
- b) Image recognition tasks, such as object detection
- c) Time series prediction
- d) Clustering of unlabeled data

### 30. In clustering, what is the role of dimensionality reduction techniques like PCA?

- a) To enhance clustering accuracy
- b) To reduce computational complexity
- c) To visualize data in fewer dimensions
- d) All of the above

### Answer Key:-

Q.No	Answer	Q.No	Answer	Q.No	Answer
1	a	11	b	21	a
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3	С	13	b	23	b
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5	С	15	a	25	b
6	b	16	С	26	a
7	b	17	b	27	B
8	b	18	b	28	
9	b	· 19	b	29	60
10	b	20	b	30	d

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### S6 Add - On Course Foundations of Data Science - Test Paper (B. Tech ECE 2021-25)

AY: 2023-24
Test Date: 06.05.2024

The respondent's email (athulyagm30@gmail.com) was recorded on submission of this form.

Name of the Student \*
Athulya GM

Register No. \*
NCE21EC010

Mail ID \*
athulyagm30@gmail.com

### MCQ - Questions

What is the primary difference between supervised and unsupervised learning?

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•	a) Supervised learning uses labeled data, while unsupervised learn	ing uses unlabeled data.
0	b) Supervised learning is faster than unsupervised learning.	1 mm
0	c) Unsupervised learning works only on large datasets.	La moman
0	d) Supervised learning uses data with missing values	Nehru College of Engineering and Research Centre (Autonomous)

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In supervised learning, what is the "target vector"?	1 point
a) A collection of input data points.	840
b) A set of features used for prediction.	
c) The vector containing the correct output values corresponding to each input in the tra	aining set.
d) The vector of predicted output values.	
	NASAS STERRIBERANDOS
Which of the following is an example of unsupervised learning?	1 point
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a) Linear regression	
b) Decision tree classification	
c) K-means clustering	
d) Support vector machines	
C -) seppert vector machines	
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Which of the following measures helps to evaluate the trade-off between sensi	itivity 1 point
(recall) and specificity in a binary classification model?	T point
a) Accuracy	
O b) Confusion matrix	
(a) ROC curve	
O d) F1 score	AL.
Od) F1 score  Nehru College of Eng Research Centre (Ad Nila Gardans, Pa	IIODO MONIO
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What is a feature vector in machine learning?	1 point
<ul> <li>a) A vector of weights learned by the model.</li> <li>b) A vector containing the true labels of the training set.</li> <li>c) A vector containing input data points, representing the values of features for a particula</li> <li>d) The set of evaluation metrics for model performance.</li> </ul>	r instance.
Which of the following is the main objective of linear regression?  a) To minimize the correlation between variables  b) To find a relationship between a dependent variable and one or more independent variable  c) To classify data into different categories  d) To calculate the distance between data points	1 point
What is the purpose of the error (loss) function in regression?  a) To optimize the classification accuracy b) To measure the difference between predicted and actual values c) To normalize the input data  Nehru College of Engineration Alia Gardens, Par Thiruvilwamala, Thriss	neering and tonomous)

In multivariate regression, the dep	pendent variable is:		1 point
a) A single scalar value			
b) A vector with multiple values			
C) Always binary			
O d) None of the above			
Which of the following is an exan	nple of an applicatior	of regression?	1 point
	•		
a) Image classification			
b) Predicting house prices			
C) Grouping similar objects togeth	her		
d) Recommending movies to user	rs		
Bias in a machine learning mode	el typically leads to:		: 🤝 1 point
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a) Overfitting the training data	Account Children Communication	a worker	
b) Underfitting the training data		Nehru College of Engl	Decripe and
C) A perfectly fitted model		Nehru College of Engl Research Centre (Au Nila Gardens, Pai Thiruvilwamala, Thriss	tonomous)
d) Random fluctuations in the pre			
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Bay	es' decision theory is used in classification to:	1 poin
0	a) Minimize the regression error	·
0	b) Find the boundary between two classes	
•	c) Maximize the likelihood of a given observation	
0	d) Measure the bias of a model	
ln B	ayesian classification for normal distributions, the disc	riminant function: 1 poir
•	a) Determines the decision boundary between classes	
0	b) Measures the bias in the classifier	
0	c) Predicts the regression coefficient	
0	d) Identifies the highest variance in the data	
Wha	at is the primary purpose of the perceptron algorithm?	1 poin
0	a) To minimize the error in regression tasks	G-T-
•	b) To classify linearly separable data	a fusion
0	c) To maximize the margin between classes	PRINCIPAL Nehru College of Engineering and
0	d) To perform dimensionality reduction	Research Centre (Autonomous) Nila Gardens, Pempany Thiruvilwamaia, Thrisaus - 29
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In the context of support vector machines (SVM), the term "margin" refers to:	1 point
a) The distance between the support vectors and the hyperplane	
b) The maximum error allowed in predictions	
C) The dimensionality of the feature space	
d) The total number of support vectors used in classification	
The XOR problem is often cited as a challenge for:	1 point
a) Linear classifiers	
b) Logistic regression	
C) Support vector machines	
O d) Decision trees	
Which of the following best describes a multilayer perceptron (MLP)?	1 point
	">
a) A single-layer network that can only solve linearly separable problems	
( b) A network that uses multiple perceptrons in a single layer	
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O d) A network that does not use activation functions  Nehru College of Engineering Research Centre (Autonomor Nila Gardens, Pampady Thiruvilwamala, Thrissur - 6805	us)
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What is the primary function of the backpropagation algorithm?	1 point
a) To initialize weights in a neural network	
b) To propagate the error backward through the network and update weights	
c) To compute the activation functions for neurons	
O d) To classify the input data into categories	
In a nonlinear classifier, the goal is to:	1 point
a) Create a linear boundary between classes	
b) Map input features into a higher-dimensional space for separation	
C) Use only one layer of neurons	
d) Limit the number of support vectors	
What is the primary objective of clustering in unsupervised learning?	1 point
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( a) To predict a target variable	
b) To group similar data points together based on features  PRINCIPA  PRINCIPA	L
C) To reduce the dimensionality of the data  Nehru College of Eng Research Centre (Au	itonomous)
Od) To find the best decision boundary between classes  Nila Gardans, Pa Thiruvilwamala, Thris	Sur - Benera
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Which of the following is a commonly used proxim	ity measure for clustering? 1 point
a) Mean squared error	
b) Euclidean distance	
C) Cross-entropy	
O d) R-squared	
In clustering, the criterion function often used to e	valuate the quality of clusters is:
a) Sum of squared distances within clusters	
b) Total prediction error	
C) The F1 score	1 4
d) Confusion matrix	La honan
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Boosting is an ensemble method that:	Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady 1 point Thiruvilwamala, Thrissur - 680598
a) Combines weak classifiers into a strong classifier between the combines and classifier between the classif	by focusing on errors of previous classifiers
b) Averages predictions from multiple classifiers to re	duce variance
C) Relies solely on a single model for predictions	
d) Uses bagging techniques to create bootstrapped d	DIESTANA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DE LA COMPANIA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DEL COMPANIA DE LA COMPANIA DE LA COMPANIA DE LA COMPANIA DE LA COMPANIA DEL COMPANIA DEL COMPANIA DEL COMPANIA DE LA COMPANIA
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Which of the following statements is true regarding of	decision trees? 1 point
a) They are sensitive to noisy data and can easily overfit.	
b) Decision trees are always linear classifiers.	
C) They cannot handle categorical data.	a construction and the second
d) They require extensive parameter tuning to perform w	ell.
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Random forests improve upon decision trees by:	1 point
a) Using only a single decision tree to make predictions	
b) Combining predictions from multiple decision trees to	reduce overfitting
C) Limiting the depth of each tree to a maximum of two l	evels
d) Using a linear regression model instead of decision tre	ees Luswan
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	Nehru College of Engineering and Research Centre (Autonomous)
What is the primary function of deep feedforward ne	tworks in deep learning? ala, Thrissurl point ag
a) To classify input data based on proximity measures	
b) To map input features to output through multiple layer	rs of neurons
C) To perform clustering on large datasets	
d) To reduce the dimensionality of the input data	THE STATE OF THE S
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In a Convolutional Neural Network (CNN), what is the m layer?	ain role of the convolutional 1 point
a) To reduce the number of parameters using max pooling	
b) To detect features such as edges and textures in the input	t image
C) To perform classification based on the input features	
d) To normalize the data before feeding it into the network	
Which of the following is a hyper-parameter in deep leatuning?	rning networks that requires 1 point
a) Number of epochs	1
• b) Training data size	Co woman
C) Mean squared error	PRINCIPAL PRINCIPAL
d) Output layer size	Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady
	Thiruvilwamala, Thrissur - 880588
What is the primary purpose of using dropouts as a reg	ularization technique in doop 1
learning?	gularization technique in deep 1 point
a) To enhance the learning rate	
b) To prevent overfitting by randomly dropping neurons duri	ng training
C) To decrease the complexity of the neural network	THIRD PRICE OF THE
d) To ensure all neurons are trained equally	THRISSUR OIL S

### What happens during weight initialization in deep learning networks?

1 point

- a) Initial weights are set to random values before training starts
- b) Weights are updated using backpropagation
- c) Weights are initialized to zero for faster convergence
- d) Initial weights are set to the mean of the dataset

### Which of the following is a common example of CNN application?

1 point

- a) Recommender systems
- b) Image recognition tasks, such as object detection
- C) Time series prediction
- ( ) Clustering of unlabeled data

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Thiruvilwamala, Thrissur - 680598

This form was created inside of Nehru College of Engineering & Research Centre.

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### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

(AN AUTONOMOUS INSTITUTION)
Pampady, Thiruvilwamala, Thrissur Dt., Kerala - 680588
NBA Accredited Programmes - 8. Tech CSB, B. Tech MTR, NAAC Re-accredited with 'A' Grade
Recognized by UGC under Section(27) of the UGC Act, 1950 180 9001:2015 Certified
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### **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### AY 2023-24 | EVEN SEMESTER

### ADD-ON COURSE - VAC S6 FOUNDATIONS OF DATA SCIENCE

### MARKS SHEET - 05.05.2024

Sl. No.	Reg. No.	Nome	Marks Scored
OI. 110.	Reg. No.	Name	30
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2	NCE21EC002	ALEESHA FATHIMA K A	21
3	NCE21EC004	ANOOJA N V	22
4	NCE21EC005	ARYA K R	23
5	NCE21EC006	ASHWIN NAIR	24
6	NCE21EC008	ASWIN V	22
7	NCE21EC009	ATHIRA P B	22
8	NCE21EC010	ATHULYA G M	24
9	NCE21EC011	AYISHA FATHIMA H	. 22
10	NCE21EC012	DHIYA J	20
11	NCE21EC013	DIYA T R	20
12	NCE21EC014	DWIJESH T D	21
13	NCE21EC015	FATHIMATHUL SAHLA C A	22
14	NCE21EC016	GOKUL A P	23
15	NCE21EC017	ISMAIL P S	24
16	NCE21EC018	JITHIN M S	25
17	NCE21EC019	KAVYA P	25
18	NCE21EC020	KRISHNAPRABHA S	. 25
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22	NCE21EC024	MIDHUN K	22
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Research Centre (Autonomous)
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Thiruvilwamala, Thrissur - december 1

Page 1 of 2







### **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### AY 2023-24 | EVEN SEMESTER

### ADD-ON COURSE - VAC S6 FOUNDATIONS OF DATA SCIENCE

### MARKS SHEET - 05.05.2024

Sl. No.	Reg. No.	Name	Marks Scored
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30	NCE21EC034	SIYA Y	22
31	NCE21EC035	SREEHARI T A	21
32	NCE21EC036	SREEVINAYAK P S	21
33	NCE21EC037	SURESH S	20
34	NCE21EC038	THRISHA S	19
35	NCE21EC039	VINAY MURALI	20

**COURSE COORDINATOR** 

HOD, ECE

PRINCIPAL

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady Thiruvilwamata, Thrissur - 680000

Page 2 of 2



AUTONOMOUS)

PAMPADY, THIRUVILWAMALA, THRISSUR DT., KERALA - 680588

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## 

### **OF COMPLETION**

PROUDLY PRESENTED TO

MS. ATHULYA G M

(NCE21EC010)

for successfully completing the add-on course on "VAC-S6 Foundations of Communication Engineering, Nehru College of Engineering and Research Centre (Autonomous), in the Even Semester of Academic Year 2023-2024. Department of Electronics by conducted Data Science"





Dr. Mredhula HOD, ECE

(ACCREDITED BY NAAC)

### PAMPADY, THIRUVILWAMALA, THRISSUR DIST.

### MINUTES OF DEPARTMENT ADVISORY COMMITTEE MEETING HELD ON 18/01/2024

A meeting of the Department Advisory Committee (DAC) was held on 18<sup>th</sup> January 2024 at 3:00 PM in the chamber of HoD, EEE department.

The following members were present:

1. Dr. Sobha Manakkal, HoD, Dept. of EEE.

2. Mr. Sundaramoorthi P. Associate Professor, Dept. of EEE.

3. Mr. Rajesh P-Assistant Professor, Dept. of EEE

4. Mr. David E-Assistant Professor, Dept. of EEE.

5. Mr. Anoop Kumar M.V-Assistant Professor, Dept. of EEE.

The following decisions were taken:

- 1. It was decided to conduct a certificate course on "ROBUST CONTROL SYSTEMS" from 23<sup>rd</sup> January 2024 to 20<sup>th</sup> April 2024 for a period of 30 hours.
- 2. The course will enhance the technical knowledge of students related the latest developments in the field of Robotics and its design.
- 3. It was decided to provide the course for 2020-24 batch UG students.
- 4. Also, it was decided to ensure compulsory attendance and staff advisors should monitor the same.

The meeting came to an end at 3:30 PM.

Nehru College of Engineering and Research Centre (Autonomous) Nile Gardens, Pampady Thiruvilwamala, Thrissur - 680588

FROM,

ANOOP KUMAR M.V,

ASSISTANT PROFESSOR,

EEE DEPARTMENT,

NCERC,

**PAMPADY** 

TO,

THE PRINCIPAL, (THROUGH HOD)

EEE DEPARTMENT,

NCERC,

**PAMPADY** 

Sir,

SUB: Requisition for conducting a value added course on" ROBUST CONTROL SYSTEMS "-Reg.

As the assistant professor of EEE department I would like to request your support and permission to conduct a certificate course on "ROBUST CONTROL SYSTEMS "from January 2024 to April 2024.The duration of the course will be for a period of 30 hours. The objective of the course is to impart in depth understanding of robust control systems used to design and manufacture robots which will be useful for student projects and for their further career. This course will act as a key to enhance knowledge level of students.

The 2020-24 batch students of EEE department are eligible for this course.

So, I request you to provide permission for doing this value added course.

Thank you for your consideration. I look forward for your response soon.

PLACE: Pampady

DATE: 18/01/2024

Your's sincerely,

ANOOP KUMAR M.V

Nehru College of Engineering and Research Centre (Autonomous) Nile Gardens, Pampady Thiruvilwamala, Thrissur - 680588

### NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE (Accredited by NAAC)

Pampady, Thiruvilwamala, Thrissur Dt.

### **ELECTRICAL AND ELECTRONICS DEPARTMENT**

NOTICE

18.01.2024

Department has decided to conduct a certificate course on "ROBUST CONTROL SYSTEMS" from January 23<sup>rd</sup> ,2024 to April 20<sup>th</sup>, 2024. The duration of the course will be for a period of 30 hours. The objective of the course is to impart knowledge on latest developments in the field of robotics and its design. This course will act as a key for enhancing know how of students on new trends in robotics and to foster their career opportunities in that field.

Students of 2020-24 batch admissions (UG) are eligible for this course. All concerned students should attend the entire course without fail. Attendance is compulsory.

### Copy:

- 1. Department Notice Board
- 2. Staff advisors(For Information to students)

3. Office file

PRINCIPAL

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady Thiruvilwamala, Thrissur - 680598 HoD





(NAAC Accredited with 'A' Grade) (Approved by AICTE, Affiliated to KTU, Kerala)

NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE NCERC, an autonomous institution with NAAC and NBA Accreditation has always been in the forefront of providing quality education, catering to the needs of society and has been ever-evolving. Nehru College of Engineering & Research Centre (NCERC), an esteemed autonomous college in Kerala, situated on the serene banks of the river Nila. Established in 2002, NCERC is a premier institution affiliated with Kerala State APJ Abdul Kalam Technological University and has been conferred with autonomous status by UGC for the academic year 2023-2024. At NCERC, we are committed to providing a top-notch academic curriculum and adopting excellent teaching pedagogy and innovative evaluation methods. As an NBA accredited engineering college in Palakkad, we take pride in offering a range of undergraduate and postgraduate programs in Engineering, Management, and IT. At NCERC, we are guided by a set of core values that define our institution and set us apart as a premier

We prioritize academic excellence and strive to provide a rigorous and comprehensive curriculum that equips students with the knowledge and skills needed to succeed in their chosen fields. Our faculty members are highly qualified and experienced, dedicated to providing quality education and mentorship to our students. Our state-of-the-art laboratories and research facilities provide students with the resources they need to explore new ideas and push the boundaries of knowledge. NCERC has strong ties with industry partners, which allows us to offer students opportunities for internships, industrial visits, and placements in leading companies. Overall, NCERC is committed to providing a transformative educational experience that empowers

educational institution.

Nehru College of Engineering and Research Centre (Autonomous) Nile Serdess, Pampady Thiruvilwamala, Thrissur - 680588 students to reach their full potential, excel in their careers, and make a positive impact on society.

### ELECTRICAL AND ELECTRONICS ENGINEERING

Department of Electrical and Electronics, NCERC, since its inception in 2004, has always believed that knowledge sharing is the way to bring change and it is necessary to remain technically updated about what new is happening all over the globe and how we can use it for making life easier and better. The Department of Electrical & Electronics

Engineering is committed to a tradition of excellence in teaching, Research and Consultancy service. With well qualified, devoted and dedicated team of teaching and non-teaching members of staff. The Department always strives for imparting Quality Technical Education for the Under Graduate & Post Graduate Program (M. Tech in Energy Systems) so as to enable the students competent enough to meet the challenges of globalization with the state-of-the art equipment's and laboratories and good interaction with industries.

### MAIN OBJECTIVE

The primary objective of this add-on course is to provide knowledge on control problems designing linear models, loop shaping etc. It aims to define robust stability and performances ,trade-offs in MIMO feedback design etc.

**Major Topics Covered:** 

- ✓ Introduction
- ✓ Key Concepts
- ✓ Robust Control Definition
- ✓ Effects of Uncertainty
- ✓ Modeling
- ✓ Available tools, techniques, and metrics
- Relationship to other topics
- ✓ Conclusions
- ✓ Annotated Reference List
- ✓ Loose Ends

Nenru College of Engineering and Research Centro (Autonomous) Nile Gerbass, Pampady Thiruvilwamala, Thrissur - 680688

### WHO SHOULD ATTEND?

All final year students of B.Tech 2020-24 Electrical and Electronics Engineering Branch.

### **RESOURCE PERSON**

Mr. Anoop Kumar M.V

Assistant Professor, Department of Electrical and Electronics Engg.,NCERC

PRINCIPAL

Nehru College of Engineering and Research Centre (Autonomous)

Nite Gardens, Pampady

Thiruvilwamala, Thrissur - 680588

### ROBUST CONTROL SYSTEMS

### 23rd January 2024 - 24th April 2024

### REGISTRATION FORM

Name

Register Number :

Department

Semester

Email-ID

Mobile Number

### **Declaration:**

The information provided is true to the best of my knowledge. I agree to abide by the rules and regulations of the course and shall attend the course for the entire duration.

Place:

Date:

Name & Signature of

Applicant

Nila Gardens, Pampady Thiruvilwamala, Thrissur - 680588

### DELECTRONICS ENGINEERING

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mitted to a tradition of excellence in teaching, Research and Consultancy service. With well qualified, devoted and dedicated team of teaching and non-teaching artment always strives for imparting Quality Technical Education for the Under Graduate & Post Graduate Program (M. Tech in Energy Systems) so as to enabugh to meet the challenges of globalization with the state-of-the art equipment's and laboratories and good interaction with industries.

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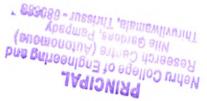
D ATTEND?

Tech 2020-24 Electrical and inch.

### **E PERSON**

Assistant Professor, Department of Electrical and Electronics Engg..NCERC





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Nehru College d'Engineering and Research Contre (Autonomous)
Nila Gardens, Pampady
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### DEPARTMENT VISION

To excel in Hechnical advotion and rescale in field of Electical & Electronics Egg. 9 mpd Unovative Eymeeting Hories, Congots and Prairie to improve the Production and Utilization of Poud and theogy for the bettelment of the notion

### DEPARTMENT MISSION

& To offel grality education in Ecotocal ( Ecotonics Eng. and Propole the Modarts for Professional Cascoll and higher Parties. 4 To Create rescalch collaboration with industries for gaining knowledge about real time Problems. A To Pregale Students who sound tachnial A To make students Socially reputible



Nehru College of Engineering and Research Centre (Autonomous) Nils Gardens, Pampady Thissur - 680588

### SYLLABUS



### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC "A"Accredited)

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### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VAC: ROBUST CONTROL SYSTEMS

### **SYLLABUS**

MODULE-I: Review of classical feedback control Review of classical feedback control: The control problem, Transfer functions, Deriving linear models, Frequency response, Feedback control, Closed loop stability, Evaluating closed - loop performance, Controller design, Loop shaping, Shaping closed loop transfer functions.

MODULE-II: Introduction to Multivariable Control Transfer functions for MIMO systems, Multivariable frequency response analysis, Control of multivariable plants. Introduction to robustness, General control problem formulation. Elements of Linear System Theory: Internal stability of feedback systems, Stabilizing controllers, System norms, Input - Output Controllability, perfect control and plant inversion, Constraints on S and T.

MODULE-III: General control formulation with uncertainty, Representing uncertainty, Obtaining P, N and M, Definition of robust stability and performance. Robust stability of the M $\Delta$  - structure, RS for complex unstructured uncertainty, RS with structured uncertainty: Motivation, The structured singular value and RS, Properties and computation of  $\mu$ , Robust performance, Application: RP with input uncertainty,  $\mu$  - synthesis and DK - iteration, Further remarks on  $\mu$ . Trade - offs in MIMO feedback design, LQG control, H2 and H $\infty$  control, H $\infty$  loop - shaping design.

Nebru College of Engineer

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady

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### SYLLABUS

Text Books: 1. Sigurd Skogestad and Ian Postlethwaite, Multivariable Feedback Control Analysis and Design - John Wiley & Sons Ltd., 2nd Edition, 2005.

2. D. W. Gu, P. Hr. Petkov and M. M. Konstantinov "Robust Control Design with MATLAB" Spring - Verlag London Ltd., 2005.

References: I. Kennin Zhou, "Robust and Optimal Control", Prentice Hall, Englewood Cliffs, New Jersy

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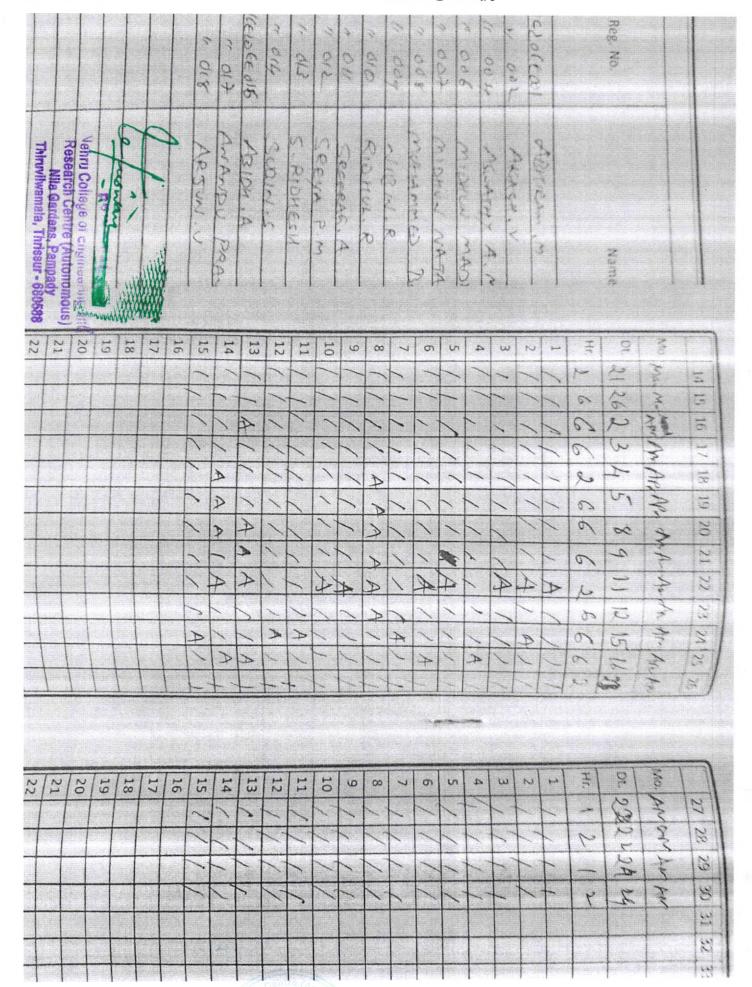
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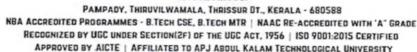
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### VALUE ADDED COURSE EXAMINATION

VALUE ADDED COURSE NAME: Robust Control Systems

Time: 1 Hr

Date:

**Student Name:** 

Marks: 30

Reg. No:

Department: Electrical and Electronics Engg.

(ANSWER ALL QUESTIONS-EACH CARRY 1 MARK)

(NO NEGATIVE MARKS)

1. What is Control System?

- a) Control system is a system in which the output is controlled by varying the input
- b) Control system is a device that will not manage or regulate the behaviour of other devices using control loops
- c) Control system is a feedback system that can be both positive and negative
- d) Control System is a system in which the input is controlled by varying the output
- 2. Which of the following is not the feature of a modern control system?
  - a) Correct power level
  - b) No oscillation
  - c) Quick response
  - d) Accuracy
- 3. What is the characteristic of a good control system?
  - a) Insensitive to the parameter variation but sensitive to the input commands
  - b) Neither sensitive to parameter variations nor sensitive to input commands
  - c) Insensitive to the input command
  - d) Sensitive to parameter variation

4. Which of the following element is not used in an automatic control system?

a) Final control element

- b) Sensor
- c) Oscillator
- d) Error detector

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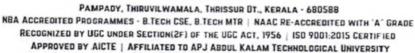
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1



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- 5. A Control System with excessive noise, is likely to suffer from which of the following?

  - b) Saturation in amplifying stages
  - c) Loss of gain
  - d) Vibrations
- 6. In closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?
  - a) G/1GH
  - b) 1/1+GH
  - c) G/1+G
  - d) 1/1+G
- 7. With negative feedback in a closed loop control system, the system sensitivity to parameter variation:
  - a) Becomes infinite
  - b) Becomes zero
  - c) Decreases
  - d) Increases
- 8. Which of the motions in actuators are preferred?
  - a) Rotary
  - b) Stationary
  - c) Non-Stationary
  - d) Translator
- 9. Assertion (A): The servo robot is a closed loop system Reason(R): It allows for a feedback
  - a) Both A and R are true and R is not correct explanation of A
  - b) Both A and R are true but R is not correct explanation of A
  - c) A is true but R is false
  - d) A is false but R is true

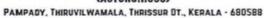
The basic components of hydraulic fluid power system are :

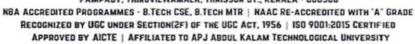
- a) Reservoir
- b) Pump and lines
- c) Actuating devices and control valves
- d) All of the mentioned

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2









<ul> <li>Deciding the method of control by:</li> <li>a) The purpose of valve</li> <li>b) Type of fluid</li> <li>c) Design and purpose of the system</li> <li>d) All of the mentioned</li> </ul>
12 is the back and forth motion of pistons inside of cylinders that provide the flow of fluid.  a) Fluid pump b) Gravity pump c) Reciprocating pump d) Displacement pump
<ul> <li>Connectors and fittings are used in the fluid power system:</li> <li>a) To connect to various sections of the fluid lines to each other</li> <li>b) To detach the fluid lines to the components of the system</li> <li>c) They are used in the high pressure fluid system</li> <li>d) None of the mentioned</li> </ul>

translates signals from the controller into the motor voltage and 14. current signals.

- a) Servo motor
- b) Servo amplifier
- c) AC motor
- d) DC motor

An automatic apparatus or device that performs functions ordinarily ascribed to humans or operate with what appears to be almost human intelligence is called

- a) Robot
- b) Human
- c) Animals
- d) Reptiles

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- 16. The laws of Robotics are:
  - a) A robot may not injure a human being
  - b) A robot must abbey the order given by human except when conflict with the first law
  - c) A robot must protect its own existence except when it is violating first and second law
  - d) Both b and c
- 17. The basic components of robot are:
  - a) The mechanical linkage
  - b) Sensors and controllers
  - c) User interface and power conversion unit
  - d) All of the mentioned
- 18. Assertion (A): Degree of freedom is defined as the number of variables to define motion in the body in space.

Reason (R): Maximum degree of freedom can be six in a robot.

- a) Both A and R are true and R is not correct explanation of A.
- b) Both A and R are true but R is not correct explanation of A.
- c) A is true but R is false
- d) A is false but R is true

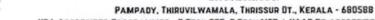
19.	A	is	connection	between	parts	or	links i	n a	robot	that	allow	motion.
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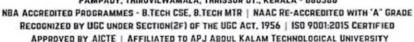
- a) Hinge
- b) Joint
- c) Dis joint
- d) None of the mentioned
- 20. Classification of Robot is based on:
  - a) Geometry and geometric classification
  - b) Left right classification
  - c) Based on control system
  - d) All of the mentioned
- 21. Hierarchical level control involves:
  - a) Level 1: Actuator control controls individual robot actuators
  - b) Level 2: Path control coordinates robot path movement
  - c) Level 3: Main control high level instruction interpreter
  - d) All of the mentioned



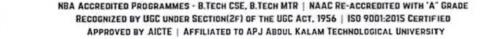


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- 22. Non servo robots are also called as:
  - a) Pick and place
  - b) Fixed stop robot
  - c) Both of the mentioned
  - d) None of the mentioned
- Characteristics of non-servo robot are: 23.
  - a) Relatively inexpensive compared to servo robots
  - b) Simple, understand and operate
  - c) Precise and reliable
  - d) Open loop system
- Which of the following is correct for proximity sensors? 24.
  - a) Inductive type
  - b) Capacitive type
  - c) Ultrasonic wave type
  - d) All of the mentioned
- Which of the following person used the name robot first time in print?
  - a) Josef capek
  - b) Karel capek
  - c) Isaac asimov
  - d) None of the mentioned
- Principles of cybernetics was developed by \_
  - a) Josef capek
  - b) Norbert wiener
  - c) Isaac asimov
  - d) Karel capek
- Which of the following represents muscles of a robot?
  - a) Actuators
  - b) Power supply
  - c) Micro controllers
  - d) Robotic arm

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- 28. ZMP stands for
  - a) Zero movement power
  - b) Zero magnetic point
  - c) Zero moment point
  - d) Zero metric point
- 29. ANN stands for
  - a) Artificial neural network
  - b) Arithmetic neural network
  - c) Artificial neural node
  - d) None of the mentioned
- 30. In ANN, neurons are represented by \_\_\_\_\_
  - a) Processing element
  - b) Memory
  - c) Wires
  - d) None of the mentioned

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### VALUE ADDED COURSE EXAMINATION

VALUE ADDED COURSE NAME: Robust Control Systems

Time: 1 Hr Marks: 30

Department: Electrical and Electronics Engg.

### ANSWER KEY

1) A	11) D	21) D
2) B	12) C	22) C
3) A	13) A	23) D
4) C	14) B	24) D
5) B	15) A	25) C
6) B	16) D	26) B
7) C	17) D	27) A
8) A	18) B	28) C
9) A	19) B	29) A
10) D	20) D	30) A

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### VALUE ADDED COURSE EXAMINATION

VALUE ADDED COURSE NAME: Ro	obust Control Systems
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Time: 1 Hr

Date:

Student Name: ABHIRAM, M

Reg. No: NCE20 EE

Department: Electrical and Electronics Engg.

(ANSWER ALL QUESTIONS-EACH CARRY 1 MARK)

(NO NEGATIVE MARKS)

What is Control System?

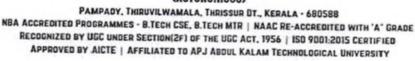
- a) Control system is a system in which the output is controlled by varying the input
- b) Control system is a device that will not manage or regulate the behaviour of other devices using control loops
- c) Control system is a feedback system that can be both positive and negative
- d) Control System is a system in which the input is controlled by varying the output
- 2. Which of the following is not the feature of a modern control system?
  - a) Correct power level
  - b) No oscillation
  - c) Quick response
  - d) Accuracy
- 3. What is the characteristic of a good control system?
  - a) Insensitive to the parameter variation but sensitive to the input commands
  - b) Neither sensitive to parameter variations nor sensitive to input commands
  - c) Insensitive to the input command
  - d) Sensitive to parameter variation
- 4. Which of the following element is not used in an automatic control system?
  - a) Final control element
  - b) Sensor
  - (c) Oscillator
  - d) Error detector

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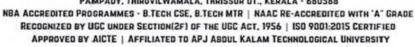
- 5. A Control System with excessive noise, is likely to suffer from which of the following?
  - a) Oscillations
  - (b) Saturation in amplifying stages
  - c) Loss of gain
  - d) Vibrations
- 6. In closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?
  - a) G/1GH
  - (b) 1/1+GH
  - c) G/1+G
  - d) 1/1+G
- 7. With negative feedback in a closed loop control system, the system sensitivity to parameter variation:
  - a) Becomes infinite
  - b) Becomes zero
- (c) Decreases
- d) Increases
- 8. Which of the motions in actuators are preferred?
  - (a) Rotary
  - b) Stationary
  - c) Non-Stationary
  - d) Translator
- 9. Assertion (A): The servo robot is a closed loop system Reason(R): It allows for a feedback
  - a Both A and R are true and R is not correct explanation of A
  - b) Both A and R are true but R is not correct explanation of A
  - c) A is true but R is false
  - d) A is false but R is true
- The basic components of hydraulic fluid power system are : 10.
  - a) Reservoir
  - b) Pump and lines
  - c) Actuating devices and control valves
  - (d) All of the mentioned

ngineering and Centre (Autonomous) Nila Gardens, Pampady Thirtivilwamela, Thrissur - 680588.

2











a) The purpose of valve b) Type of fluid c) Design and purpose of the system d) All of the mentioned
12 is the back and forth motion of pistons inside of cylinders that provide the flow of fluid.  a) Fluid pump b) Gravity pump c) Reciprocating pump d) Displacement pump
13. Connectors and fittings are used in the fluid power system:  (a) To connect to various sections of the fluid lines to each other  b) To detach the fluid lines to the components of the system  c) They are used in the high pressure fluid system  d) None of the mentioned
14. A translates signals from the controller into the motor voltage and current signals.  a) Servo motor  b) Servo amplifier c) AC motor d) DC motor
15. An automatic apparatus or device that performs functions ordinarily ascribed to humans or operate with what appears to be almost human intelligence is called
Robot b) Human c) Animals d) Reptiles  PRINCIPAL Nehru College of Engineering and Research Centre (Autonomous) Nils Gardens, Pampady Thiruvilwamala, Thrissur - 680588

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NBA ACCREDITED PROGRAMMES - 8.TECH CSE, 8.TECH MTR | NAAC RE-ACCREDITED WITH 'A" GRADE

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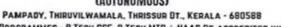
- 16. The laws of Robotics are:
  - a) A robot may not injure a human being
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- 17. The basic components of robot are:
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- d) All of the mentioned
- Assertion (A): Degree of freedom is defined as the number of variables to define motion in the body in space.

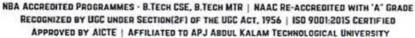
Reason (R): Maximum degree of freedom can be six in a robot.

- a) Both A and R are true and R is not correct explanation of A.
- (b) Both A and R are true but R is not correct explanation of A.
- c) A is true but R is false
- d) A is false but R is true
- 19. A \_\_\_\_\_ is connection between parts or links in a robot that allow motion.
  - a) Hinge
  - (b) Joint
  - c) Dis joint
  - d) None of the mentioned
- 20. Classification of Robot is based on:
  - a) Geometry and geometric classification
  - b) Left right classification
  - c) Based on control system
  - (d) All of the mentioned
- 21. Hierarchical level control involves :
  - a) Level 1: Actuator control controls individual robot actuators
  - b) Level 2: Path control coordinates robot path movement
  - c) Level 3: Main control high level instruction interpreter
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Non servo robots are also called as:

- a) Pick and place
- b) Fixed stop robot
- © Both of the mentioned
- d) None of the mentioned
- Characteristics of non-servo robot are:
  - a) Relatively inexpensive compared to servo robots
  - b) Simple, understand and operate
  - c) Precise and reliable
  - (d) Open loop system
- Which of the following is correct for proximity sensors?
  - a) Inductive type
  - b) Capacitive type
  - c) Ultrasonic wave type
  - (d) All of the mentioned
- Which of the following person used the name robot first time in print?
  - a) Josef capek
  - b) Karel capek
  - (c) Isaac asimov
  - d) None of the mentioned
- 26. Principles of cybernetics was developed by
  - a) Josef capek
- (b) Norbert wiener
- c) Isaac asimov
- d) Karel capek
- Which of the following represents muscles of a robot?
- (a) Actuators
- b) Power supply
- c) Micro controllers
- d) Robotic arm

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28.	ZMP stands for	
a)	Zero movement power	

- b) Zero magnetic point © Zero moment point
- d) Zero metric point
- 29. ANN stands for
- (a) Artificial neural network
  - b) Arithmetic neural network
  - c) Artificial neural node
  - d) None of the mentioned
- In ANN, neurons are represented by \_
- a) Processing element b) Memory
- c) Wires
- d) None of the mentioned

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#### VALUE ADDED COURSE EXAMINATION

VALUE ADDED COURSE NAME: Robust Control Systems

Time: 1 Hr

Student Name: MUHAMMED BADHUSHA S

Marks: 30

Date: 24/04/24

Reg. No: NCELOREDOY

Department: Electrical and Electronics Engg.

(ANSWER ALL QUESTIONS-EACH CARRY 1 MARK)

(NO NEGATIVE MARKS)

1. What is Control System?

(a) Control system is a system in which the output is controlled by varying the input

b) Control system is a device that will not manage or regulate the behaviour of other devices using control loops

c) Control system is a feedback system that can be both positive and negative

d) Control System is a system in which the input is controlled by varying the output

2. Which of the following is not the feature of a modern control system?

- a) Correct power level
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- c) Quick response
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(c) Oscillator

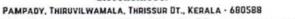
d) Error detector

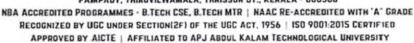
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<ol><li>A Control Syst</li></ol>	em with exc	essive noise,	is likely to	suffer from	which of the	following?
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a) Oscillations

- (b) Saturation in amplifying stages
- c) Loss of gain
- d) Vibrations
- 6. In closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?
  - a) G/1GH
  - b) 1/1+GH
  - c) G/1+G
  - d) 1/1+G
- 7. With negative feedback in a closed loop control system, the system sensitivity to parameter variation:
  - a) Becomes infinite
  - b) Becomes zero
- (c) Decreases
- d) Increases
- 8. Which of the motions in actuators are preferred?
  - (a) Rotary
- (b) Stationary
  - c) Non-Stationary
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- 9. Assertion (A): The servo robot is a closed loop system Reason(R): It allows for a feedback
- (a) Both A and R are true and R is not correct explanation of A
- b) Both A and R are true but R is not correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

10. The basic components of hydraulic fluid power system are :

- a) Reservoir
- b) Pump and lines
- c) Actuating devices and control valves

d) All of the mentioned

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2





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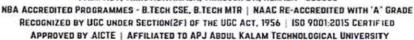


<ul><li>a) The purpose</li><li>b) Type of fluid</li></ul>	ourpose of the syst			
provide the flow a) Fluid pump b) Gravity pump c) Reciprocatin d) Displacemen	of fluid.	nd forth motior	of pistons inside o	of cylinders that
a) To connect to b) To detach the	e fluid lines to the o d in the high press	ns of the fluid components of	lines to each other the system	er
14. A		nals from the co	ontroller into the mo	otor voltage and
		PRIN Nehru College C Research Cem Nila Garde Thiruvilwamala	orms functions ordinate the factor of the fa	
		3		



(AUTONOMOUS)

PAMPADY, THIRUVILWAMALA, THRISSUR DT., KERALA - 680588





16.	The	laws	of	Robotics	are:

- a) A robot may not injure a human being
- b) A robot must abbey the order given by human except when conflict with the first law
- c) A robot must protect its own existence except when it is violating first and second law
- (d) Both b and c
- 17. The basic components of robot are:
  - a) The mechanical linkage
  - b) Sensors and controllers
  - c) User interface and power conversion unit
  - (d) All of the mentioned
- 18. Assertion (A): Degree of freedom is defined as the number of variables to define motion in the body in space.

Reason (R): Maximum degree of freedom can be six in a robot.

- a) Both A and R are true and R is not correct explanation of A.
- (b) Both A and R are true but R is not correct explanation of A.
  - c) A is true but R is false
- d) A is false but R is true
- 19. is connection between parts or links in a robot that allow motion.
  - a) Hinge
- (b) Joint
- c) Dis joint
- d) None of the mentioned
- 20. Classification of Robot is based on:
  - a) Geometry and geometric classification
  - b) Left right classification
  - c) Based on control system
  - d) All of the mentioned
- Hierarchical level control involves: 21.
  - a) Level 1: Actuator control controls individual robot actuators
  - b) Level 2: Path control coordinates robot path movement
  - c) Level 3: Main control high level instruction interpreter
  - d) All of the mentioned

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22.	Non	servo	robots	are	also	called	as:

- a) Pick and place
- b) Fixed stop robot
- © Both of the mentioned
- d) None of the mentioned

#### 23. Characteristics of non-servo robot are:

- a) Relatively inexpensive compared to servo robots
- b) Simple, understand and operate
- c) Precise and reliable
- d)Open loop system 🔻

24.	Which	of the	e following	is	correct	for	proximity	sensors?
-----	-------	--------	-------------	----	---------	-----	-----------	----------

- a) Inductive type
- b) Capacitive type
- c) Ultrasonic wave type
- (d) All of the mentioned

- a) Josef capek
- b) Karel capek
- © saac asimov
- d) None of the mentioned

26.	Dain - in la f		as developed by
16	Principles of	cynernetics wa	as developed by
40.		CADCILICTION AND	as acveloped by

- a) Josef capek
- (b) Norbert wiener
- c) Isaac asimov
- d) Karel capek

27. Which of the following represents muscles of a robot?

- Actuators
- b) Power supply
- c) Micro controllers
- d) Robotic arm

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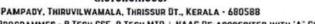
- 28. ZMP stands for \_\_\_\_\_
  - a) Zero movement power
  - b) Zero magnetic point
  - ©Zero moment point
  - d) Zero metric point
- 29. ANN stands for
  - Artificial neural network
  - b) Arithmetic neural network
  - c) Artificial neural node
  - d) None of the mentioned
- In ANN, neurons are represented by \_\_\_\_\_
- (a) Processing element
  - b) Memory
  - c) Wires
- d) None of the mentioned

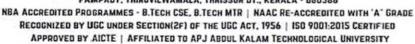
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# ACT HG

#### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

(AUTONOMOUS)









5. A Control System with excessive noise, is likely to suffer from which of the following?

a) Oscillations

√b) Saturation in amplifying stages

- c) Loss of gain
- d) Vibrations
- 6. In closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?
  - a) G/1GH
- (b) 1/1+GH
  - c) G/1+G
  - d) 1/1+G
- 7. With negative feedback in a closed loop control system, the system sensitivity to parameter variation:
  - a) Becomes infinite
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2



PAMPADY, THIRUVILWAMALA, THRISSUR DT., KERALA - 680588 NBA ACCREDITED PROGRAMMES - B.TECH CSE, B.TECH MTR | NAAC RE-ACCREDITED WITH 'A' GRADE

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#### VALUE ADDED COURSE EXAMINATION

VALUE ADDED COURSE NAME: Robust Control Systems

Time: 1 Hr

Marks: 30

Date: 24 -04-24

Student Name: Abidh. A

Reg. No: [NCELO EE OIS

Department: Electrical and Electronics Engg.

(ANSWER ALL QUESTIONS-EACH CARRY 1 MARK)

(NO NEGATIVE MARKS)

1. What is Control System?

Control system is a system in which the output is controlled by varying the input

b) Control system is a device that will not manage or regulate the behaviour of other devices using control loops

c) Control system is a feedback system that can be both positive and negative

d) Control System is a system in which the input is controlled by varying the output

- 2. Which of the following is not the feature of a modern control system?
  - a) Correct power level
  - (b) No oscillation
- Quick response
- d) Accuracy
- 3. What is the characteristic of a good control system?
- a) Insensitive to the parameter variation but sensitive to the input commands
  - b) Neither sensitive to parameter variations nor sensitive to input commands
- c) Insensitive to the input command
- d) Sensitive to parameter variation
- 4. Which of the following element is not used in an automatic control system?
  - a) Final control element
  - b) Sensor
  - (e) Oscillator
  - d) Error detector

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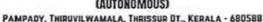
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1



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The laws of Robotics are:

- a) A robot may not injure a human being
- b) A robot must abbey the order given by human except when conflict with the first law
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- d) Both b and c
- The basic components of robot are:
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- C) User interface and power conversion unit
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a) Hinge

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  - a) Level 1: Actuator control controls individual robot actuators
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  - c) Level 3: Main control high level instruction interpreter

d) All of the mentioned

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11. Deciding the method of control by:  a) The purpose of valve b) Type of fluid c) Design and purpose of the system d) All of the mentioned
12 is the back and forth motion of pistons inside of cylinders that provide the flow of fluid.  a) Fluid pump b) Gravity pump c) Reciprocating pump d) Displacement pump
<ul> <li>13. Connectors and fittings are used in the fluid power system:</li> <li>a) To connect to various sections of the fluid lines to each other</li> <li>b) To detach the fluid lines to the components of the system</li> <li>c) They are used in the high pressure fluid system</li> <li>d) None of the mentioned</li> </ul>
14. A translates signals from the controller into the motor voltage and current signals.  a) Servo motor  b) Servo amplifier c) AC motor d) DC motor
15. An automatic apparatus or device that performs functions ordinarily ascribed to humans or operate with what appears to be almost human intelligence is called

a) Robot

b) Human

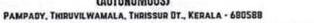
c) Animals

d) Reptiles

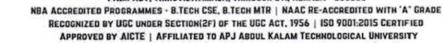
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3

# NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (AUTONOMOUS)









<ol> <li>Nor</li> </ol>	servo	robots	are	also	called	as:
-------------------------	-------	--------	-----	------	--------	-----

- a) Pick and place
- b) Fixed stop robot
- C) Both of the mentioned
  - d) None of the mentioned
- Characteristics of non-servo robot are:
  - a) Relatively inexpensive compared to servo robots
  - b) Simple, understand and operate
- C) Precise and reliable
  - d) Open loop system

24	10/10:06	-f +h -	fallouing	10	aarraat	for	provimity	sensors?
24.	vvnicn	or the	TOILOWING	IS	correct	101	DIOXIIIIIV	Selisors

- a) Inductive type
- b) Capacitive type
- c) Ultrasonic wave type
- All of the mentioned

25.	Which of the fo	ollowing person	used the name	robot	first time	in print?
-----	-----------------	-----------------	---------------	-------	------------	-----------

- a) Josef capek
- b) Karel capek
- S Isaac asimov
  - d) None of the mentioned

26.	Principles of	of cybernetics	was developed	by

- a) Josef capek
- b) Norbert wiener
  - c) Isaac asimov
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Which of the following represents muscles of a robot? 27.

(a) Actuators

- b) Power supply
- c) Micro controllers
- d) Robotic arm

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(AUTONOMOUS)





NBA

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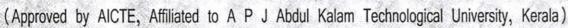
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  - a) Zero movement power
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  - c) Wires
  - d) None of the mentioned

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Thiruvilwamala, Thrissur - 680598



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# CERTIFICATE

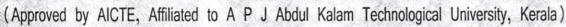
	Engineeri	ng Depa	ABHIRAM M (NCE20EE001)Of Electrical artment has successfully completed
the Certifictae/A	ddon Co	urse on	ROBUST CONTROL SYSTEMS
from <u>23/01/2023</u>	to24	/04/2023	_ at Nehru College of Engineering &
Research Centre	e, Pamapo	dy.	

Course Coordinator

HoD Nehru C EEE Department



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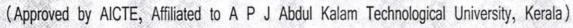


# CERTIFICATE

This is to Certify that 1 and Electronics Engineering the Certifictae/Addon Cour	g Department has success	
from 23/01/2023 to 24/04 Research Centre, Pamapdy	at Nehru College o	f Engineering &
Course Coordinator Research Cent	EPAP ( Supplement ) (	Principal NCERC



(NAAC Accredited)





# CERTIFICATE

This is to Certify that Mr. MUHAMMED	BADHUSHA (NCE20EE008)	of Electrical
and Electronics Engineering Depar	tment has successfull	y completed
the Certifictae/Addon Course on _	ROBUST CONTROL SYSTE	EMS

from 23/01/2023 to 24/04/2023 at Nehru College of Engineering & Research Centre, Pamapdy.

Course Coordinator

PRINCIPAL

Research Centre (Autonomous)
Nile Gardens, Pampady

HoD

**EEE Department** 

Principal

NCERC

# NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (ACCREDITED BY NAAC)

#### PAMPADY, THIRUVILWAMALA, THRISSUR DIST.

#### MINUTES OF DEPARTMENT ADVISORY COMMITTEE MEETING HELD ON 05/09/2023

A meeting of the Department Advisory Committee (DAC) was held on 5th July 2023 at 3:00 PM in the chamber of HoD, Mechanical Engineering department.

The following members were present:

- 1. Dr. APPADURAI M, Associate Professor, MECH
- 2. Lt. SANOJ T, Assistant Professor, MECH
- 3. Mr. MANURAJ K R, Assistant Professor, MECH
- 4. Mr. VIMAL M N, Assistant Professor, MECH
- 5. Mr. RAHUL R, Assistant Professor, MECH
- 6. Mr. RAKESH P R, Assistant Professor, MECH
- 7. Mr. Baisel Paul, Assistant Professor, MECH

The following decisions were taken:

- 1. It was decided to conduct a certificate course on "Additive Manufacturing" from 11th September 2023 to 17<sup>th</sup> November 2023 for a period of 30 hours.
- 2. The course will enhance the technical knowledge of students in the latest developments in the field of automation in manufacturing field.
- 3. It was decided to provide the course for 2022-26, 2021-25, 2020-24 batch UG students.
- 4. Also, it was decided to ensure compulsory attendance and staff advisors should monitor the same.

The meeting came to an end at 4:00 PM.



# NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE PAMPADY, THIRUVILWAMALA, THRISSUR DIST, KERALA-680588



(Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

#### **DEPARTMENT OF MECHANICAL ENGINEERING**

The Department of Mechanical Engineering is planning to conduct a 30 hour certificate course scheduled during the months; September to December of this academic year 2023-2024. The course is intended to be beneficial for students in their academics as well as professional life and therefore is offered to all S3/S5/S7 B.Tech Mechanical Engineering students. All students are hereby directed to enroll in the course mandatorily.

COURSENAME

: ADDITIVE MANUFACTURING

PROGRAM CO-ORDINATOR

: Dr. Appadurai M

Associate Professor-

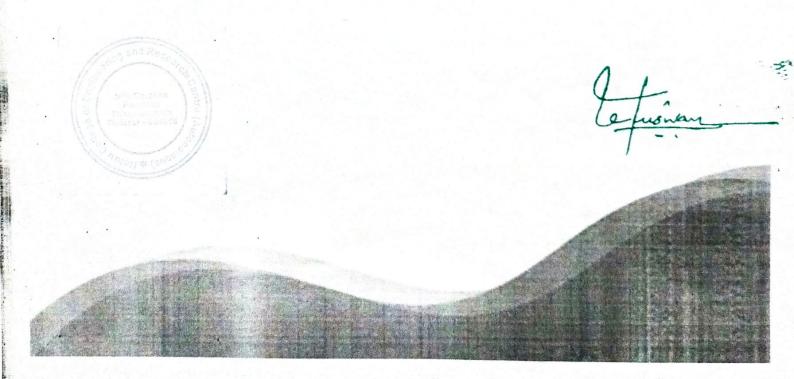
Department of Mechanical Engineering

DATE OF COMMENCEMENT

:11th September 2023

COURSE DURATION

: 30 Hours



From,

#### Dr. Appadurai M

Associate Professor

Department Of Mechanical Engineering

Nehru College of Engineering and Research Centre

Pampady, Thrissur

To,

#### The Principal

Nehru College of Engineering and Research Centre

Pampady, Thrissur

Respected sir,

Sub: Permission to conduct ADD ON Course

The Department of Mechanical Engineering is planning to conduct 30 hour certification course "ADDITIVE MANUFACTURING" scheduled during the months September to December of this academic year 2023-2024 odd semester for S3/S5/S7 B.Tech Mechanical Engineering students.

I humbly request you to kindly grant the permission for the same.

Thanking You,

Place: Pampady

Date: 21/07/2023

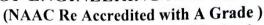
Yours Sincerely

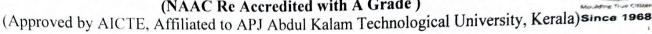
Dr. Appadurai M

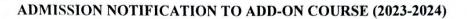


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Applications are invited for admission for the Add-On Course 'ADDITIVE MANUFACTURING "offered by the Department of Mechanical Engineering, Nehru college of Engineering and Research Centre, Pampady.

#### **Eligibility Criteria:**

All UG/PG Engineering students are Eligible.

Interested Students can give their names to respective class advisors on before 3/08/2023

#### Timing:

2.00PM to 4.00PM. On Tuesday

#### Attendance:

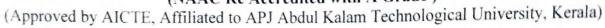
A minimum of 75% attendance is required for writing the examination.

#### **Important Dates:**

Commencement of Classes: 9/11/2023

Examination date: 21/12/2023

(NAAC Re Accredited with A Grade)





#### DEPARTMENT OF MECHANICAL ENGINEERING

#### ENROLMENT LIST OF CERTIFICATE COURSE (2023-2024) (ODD SEM)

#### COURSE NAME: ADDITIVE MANUFACTURING

S. No	Reg No	Name	Semester	Yea
1.	NCE22ME001	ABHIJITH S	3	II
2.	NCE22ME002	ABILASH SHARMA	3	II
3.	NCE22ME003	AJMAL P	3	II
4.	NCE22ME004	AKHIL K S	3	II
5.	NCE22ME005	ATHULKRISHNA J	3	II
6.	NCE22ME006	AVINKUMAR P S	3	II
7.	NCE22ME007	KRISHNANUNNI P.S	3	II
8.	NCE22ME008	NEERAJ K	3	II
9.	NCE22ME009	PRAJITH K NAIR	3	II
10.	NCE22ME011	SREERAJ E H	3	II
11.	LNCE22ME012	SANJAY T S	3	II
12.	LNCE22ME013	SAYOOJ K R	3	II
13.	LNCE22ME014	YEDUKRISHNAN T	3	II
14.	NCE21ME002	ABHIJITH R	5	III
15.	NCE21ME003	AJITH K	5	III
16.	NCE21ME004	ASWIN P	5	III
17.	NCE21ME005	HARIKRISHNAN K MENON	5	III
18.	NCE21ME007	K ABHIJITH	5	III
19.	NCE21ME008	KRISHNAJITH U	5	III
20.	NCE21ME011	SIDHARTH P	5	III
21.	NCE21ME012	SINGITH SAJI	5	III
22.	NCE21ME013	SURAJ R	5	III
23.	NCE20ME001	ADHITHYAN M A	7	IV
24.	NCE20ME002	AKASH MENON P	7	IV
25.	NCE20ME004	ARJUN P V	7	IV
26.	NCE20ME006	P S ARJUN NARAYAN	7	IV
27.	NCE20ME007	SRUTHIN C	7	IV
28.	NCE20ME008	S SAIKIRAN	7	IV
29.	NCE20ME010	YADHUKRISHNA K U	7	IV
30.	NCE20ME011	YASWANTH K	7	IV
31.	NCE20ME012	YOUNUS A Y	7	IV
32	LNCE20ME013	AJITH KANNA	7	\ IV

Head of the Department

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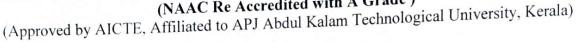
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# DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE COURSE 2023-24 ODD SEMESTER-EXAM

# COURSE NAME: ADDITIVE MANUFACTURING

Time: 1 Hr

Max Marks: 50

**Answer all Questions** (Each carries 2 Marks)

1.	From	following,	the alterna	tive name	for	RP	is	
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- (A) Additive Manufacturing
- (B) Layer Manufacturing
- (C) Direct CAD Manufacturing
- (D) All of the above

# 2. Which of the following is not Liquid-based RP system?

- (A) Stereo lithography Apparatus (SLA)
- (B) Laminated Object Manufacturing (LOM)
- (C) Solid Ground Curing (SGC)
- (D) Solid Object Ultraviolet-Laser Printer (SOUP)

# 3. Which of the following is not subtractive process?

- (A) Milling
- (B) Stereo-lithography
- (C) Sawing
- (D) EDM

# 4. Choose the correct sequence to generate prototype.

- (A) 3D CAD data CAD solid model STL file RP prototype
- (B) CAD solid model 3D CAD data RP prototype STL file
- (C) STL file 3D CAD data CAD solid model RP prototype
- (D) 3D CAD data STL file CAD solid model RP prototype

#### 5. Full form of STL is

- (A) Straight-lithography
- (B) Streto-lithography
- (C) Stereo-lithography
- (D) Straight-lipsography

#### 6. What is the full name of SLS?

- (A) Selective Laser Simulator
- (B) Sintering Laser Simulator
- (C) Selective Laser Sintering
- (D) Stereolithography Laser Sintering



Page 1 of 4

NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC Re Accredited with A Grade)
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7. Process of converting STL file model in to layers is calledin RP.  (A) Chopping (B) Slicing (C) Cutting (D) Trimming
8. Which of the following aspects is mainly concerned with molding the final shape around the basic skeleton?  (A) Functional aspect (B) Operational aspect (C) Aesthetic aspect (D) None of these
9. The STL files translate the part geometry from a CAD system to  (A) CNC machine (B) CMM machine (C) RP machine (D) CAPP machine
10. In the process, one starts with a single block of solid material larger than the final size of the desired object and material is removed until the desired shape is reached.  (A) Subtractive process (B) Additive process (C) Formative process (D) All of above
11. Which of the following addresses the need to design a product for safety?  (A) Soft-Hard Review (B) Effect Analysis (C) Experimental design (D) None of these
12. Full form of FDM is  (A) Fixed Development Modelling (B) Fusion Development Modelling (C) Fused Deposition Modelling (D) Focused Deposition Modelling
13. The process of obtaining a geometric CAD model from 3D points acquired by scanning/digitizing existing parts/products is best known as:  (A) Forward Engineering (B) Backward Engineering (C) Reverse Engineering (D) Product Engineering



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#### 14. In the entire reverse engineering process for product design, which one is the first step?

- (A) CAD model updating
- (B) CAD modeling
- (C) Data pre-processing
- (D) Data capturing

#### 15. Which of the following RP system is not developed by 3D systems?

- (A) Selective Laser Sintering (SLS)
- (B) Multi-Jet Modeling System (MJM)
- (C) Paper Lamination Technology (PLT)
- (D) Stereo lithography Apparatus (SLA)

#### 16. Which of the following is used as base material in Stereolithography (SLA) process?

- (A) Thermoplastics, Metals powders
- (B) Thermoplastics, Eutectic metals.
- (C) Photopolymer
- (D) Titanium alloys

#### 17. What is the third step in Reverse Engineering?

- (A) Digitization of the object
- (B) Creation of CAD model
- (C) Prototype
- (D) None of these

## 18. Which of the following advantage does not possess by the rapid prototyping process over the

#### traditional prototyping process?

- (A) It consumes less time
- (B) Gives better quality
- (C) Reduces product launch time
- (D) It's cheaper

#### 19. Which kind of laser is used to cut the sheets in LOM?

- (A) Ruby Laser
- (B) Carbon Dioxide Laser
- (C) He-Ne Laser
- (D) None of these

#### 20. STL file format is represented by interaction of

- (A) lines and hexagons
- (B) lines and rectangles
- (C) lines and triangles
- (D) lines and circles



Page 3 of 4

# NCERC !

# NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

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21. Which among the following processes, is most important part of product development?

- (A) Packaging
- (B) Purchasing
- (C) Engineering Design Process
- (D) Marketing

22. Which material can be efficiently used as a support material?

- (A) ABS
- (B) PLA
- (C) Nylon
- (D) INF

23. Which file format cannot be converted into STL file format?

- (A) .prt
- (B) .sld
- (C).dwg
- (D).stp

24. STL files contains \_\_\_\_\_.

- (A) Mass properties of the model
- (B) Geometrical data
- (C) Drawing data
- (D) all of the above

25. To meet the customer's demand in today's market, we need:

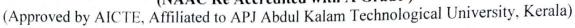
- (A) Rapid Manufacturing
- (B) Conventional Manufacturing
- (C) Unconditional Manufacturing
- (D) None of these



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#### DEPARTMENT OF MECHANICAL ENGINEERING

#### **ENROLMENT LIST OF CERTIFICATE COURSE (2023-2024) (ODD SEM)**

#### COURSE NAME: ADDITIVE MANUFACTURING ANSWER KEY

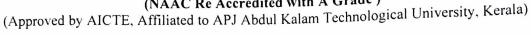
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- 5. (Ans:c)
- 6. (Ans:c)
- 7. (Ans:b)
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- 21. (Ans:c)
- 22. (Ans:d)
- 23. (Ans:c)
- 24.(Ans:b)
- 25. (Ans:a)



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# DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE COURSE 2023-24 ODD SEMESTER-EXAM

Time: 1 Hr	COURSE NAME: AD	DITIVE MANUFACTURING	Max	Marks: 50
Student Name:	Neeraj KN	Cl	ass:	<u>\$</u>

Student Name: Nee YO K N
Answer all Questions (Each carries 2 Marks)
1. From following, the alternative name for RP is  (A) Additive Manufacturing  (B) Layer Manufacturing  (C) Direct CAD Manufacturing  (D) All of the above
2. Which of the following is not Liquid-based RP system?  (A) Stereo lithography Apparatus (SLA)  (B) Laminated Object Manufacturing (LOM)  (C) Solid Ground Curing (SGC)  (D) Solid Object Ultraviolet-Laser Printer (SOUP)
3. Which of the following is not subtractive process?  (A) Milling (B) Stereo-lithography (C) Sawing (D) EDM
4. Choose the correct sequence to generate prototype.  (A) 3D CAD data - CAD solid model - STL file - RP prototype  (B) CAD solid model - 3D CAD data - RP prototype - STL file  (C) STL file - 3D CAD data - CAD solid model - RP prototype  (D) 3D CAD data - STL file - CAD solid model - RP prototype

5. Full form of STL is

- (A) Straight-lithography
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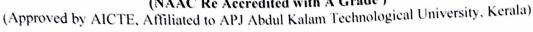
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(B) Backward Engineering	
C) Reverse Engineering	
(D) Product Engineering	
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21.	Which	among	the	following	processes,	is	most	important	part	of	product
	elopmen										
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- (A) Packaging
- (B) Purchasing
- (Engineering Design Process
- (D) Marketing

# 22. Which material can be efficiently used as a support material?

- (A) ABS
- (B) PLA
- (C) Nylon
- (D) INF

# 23. Which file format cannot be converted into STL file format?

- (A) .prt
- (B) .sld
- (C) dwg
- (D) .stp

#### 24. STL files contains

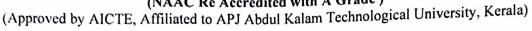
- (A) Mass properties of the model
- (B) Geometrical data
- (C) Drawing data
- (D) all of the above

# 25. To meet the customer's demand in today's market, we need:

- (A) Rapid Manufacturing
- (B) Conventional Manufacturing
- (C) Unconditional Manufacturing
- (D) None of these



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### DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE COURSE 2023-24 ODD SEMESTER-EXAM

COURSE NAME: ADDITIVE MANUFACTOR Time: 1 Hr	U <b>RING</b> Ma	x Marks : 5	0
Student Name: YADHUKRISHNAKU	Class:_	S3	
Answer all Questions (Each carries 2 Marks)			
1. From following, the alternative name for RP is  (A) Additive Manufacturing (B) Layer Manufacturing (C) Direct CAD Manufacturing (D) All of the above			
2. Which of the following is not Liquid-based RP system?  (A) Stereo lithography Apparatus (SLA)  (B) Laminated Object Manufacturing (LOM)  (C) Solid Ground Curing (SGC)  (D) Solid Object Ultraviolet-Laser Printer (SOUP)		,	
3. Which of the following is not subtractive process?  (A) Milling (B) Stereo-lithography (C) Sawing (D) EDM			
4. Choose the correct sequence to generate prototype.  (A) 3D CAD data - CAD solid model - STL file - RP prototype (B) CAD solid model - 3D CAD data - RP prototype - STL file (C) STL file - 3D CAD data - CAD solid model - RP prototype (D) 3D CAD data - STL file - CAD solid model - RP prototype			
5.Full form of STL is  (A) Straight-lithography (B) Streto-lithography (C) Stereo-lithography (D) Straight-lipsography			
6. What is the full name of SLS?			

(A) Selective Laser Simulator(B) Sintering Laser Simulator(C) Selective Laser Sintering

(D) Stereolithography Laser Sintering

Page 1 of 4

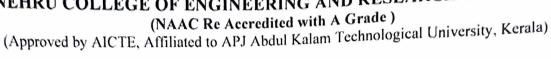


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7. Process of converting STL file model in to layers is calledin RP.  (A) Chopping (B) Slicing (C) Cutting (D) Trimming
8. Which of the following aspects is mainly concerned with molding the final shape around the basic skeleton?  (A) Functional aspect (B) Operational aspect (C) Aesthetic aspect (D) None of these
9. The STL files translate the part geometry from a CAD system to  (A) CNC machine (B) CMM machine (C) RP machine (D) CAPP machine
10. In the process, one starts with a single block of solid material larger than the final size of the desired object and material is removed until the desired shape is reached.  A Subtractive process  (B) Additive process  (C) Formative process  (D) All of above
11. Which of the following addresses the need to design a product for safety?  (A) Soft-Hard Review (B) Effect Analysis (C) Experimental design (D) None of these
12. Full form of FDM is  (A) Fixed Development Modelling  (B) Fusion Development Modelling  (C) Fused Deposition Modelling  (D) Focused Deposition Modelling
13. The process of obtaining a geometric CAD model from 3D points acquired by scanning/digitizing existing parts/products is best known as:  (A) Forward Engineering (B) Backward Engineering (C) Reverse Engineering (D) Product Engineering

(B) lines and rectangles C lines and triangles
(D) lines and circles

## NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

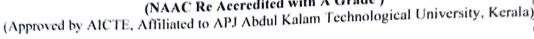




14. In the entire reverse engineering process for product design, which one is the first step?  (A) CAD model updating (B) CAD modeling (C) Data pre-processing (D) Data capturing
<ul> <li>15. Which of the following RP system is not developed by 3D systems?</li> <li>(A) Selective Laser Sintering (SLS)</li> <li>(B) Multi-Jet Modeling System (MJM)</li> <li>(C) Paper Lamination Technology (PLT)</li> <li>(D) Stereo lithography Apparatus (SLA)</li> </ul>
16. Which of the following is used as base material in Stereolithography (SLA) process?  (A) Thermoplastics, Metals powders (B) Thermoplastics, Eutectic metals.  (C) Photopolymer (D) Titanium alloys
17. What is the third step in Reverse Engineering?  (A) Digitization of the object  (B) Creation of CAD model  (C) Prototype  (D) None of these
18. Which of the following advantage does not possess by the rapid prototyping process over the traditional prototyping process?  (A) It consumes less time (B) Gives better quality (C) Reduces product launch time (D) It's cheaper
19. Which kind of laser is used to cut the sheets in LOM?  (A) Ruby Laser  (B) Carbon Dioxide Laser  (C) He-Ne Laser  (D) None of these
20. STL file format is represented by interaction of  (A) lines and hexagons

Page 3 of 4

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21. Which among the following processes, is most important part of product development?

- (A) Packaging
- (B) Purchasing
- (C) Engineering Design Process
- (D) Marketing

22. Which material can be efficiently used as a support material?

- (A) ABS
- (B) PLA
- (C) Nylon
- (D) INF

23. Which file format cannot be converted into STL file format?

- (A) .prt
- (B) .sld
- (C) .dwg
- (D) .stp

24. STL files contains

- (A) Mass properties of the model
- ((B))Geometrical data
- (C) Drawing data
- (D) all of the above

25 To meet the customer's demand in today's market, we need:

- (A) Rapid Manufacturing
- (B) Conventional Manufacturing
- (C) Unconditional Manufacturing
- (D) None of these



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### DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE COURSE 2023-24 ODD SEMESTER-EXAM

COURSE NAME: ADDITIVE MANUFACTURING

Student Name: Ala local

Max Marks: 50

Class: 52

**Answer all Questions** (Each carries 2 Marks)

- 1. From following, the alternative name for RP is \_\_\_\_\_
- (A) Additive Manufacturing
- (B) Layer Manufacturing
- (C) Direct CAD Manufacturing
- (D) All of the above

Time: 1 Hr

- 2. Which of the following is not Liquid-based RP system?
- (A) Stereo lithography Apparatus (SLA)
- (B) Laminated Object Manufacturing (LOM)
- (C) Solid Ground Curing (SGC)
- (D) Solid Object Ultraviolet-Laser Printer (SOUP)
- 3. Which of the following is not subtractive process?
- (A) Milling
- (B) Stereo-lithography
- (C) Sawing
- (D) EDM
- 4. Choose the correct sequence to generate prototype.
- (A) 3D CAD data CAD solid model STL file RP prototype
- (B) CAD solid model 3D CAD data RP prototype STL file
- (C) STL file 3D CAD data CAD solid model RP prototype
- (D) 3D CAD data STL file CAD solid model RP prototype
- 5. Full form of STL is
- (A) Straight-lithography
- (B) Streto-lithography
- (©) Stereo-lithography
- (D) Straight-lipsography
- 6. What is the full name of SLS?
- (A) Selective Laser Simulator
- (B) Sintering Laser Simulator
- (C) Selective Laser Sintering
- (D) Stereolithography Laser Sintering

Page 1 of 4



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Since 1968

7. Process of converting STL file model in to layers is calledin RP.	
(A) Chopping	
(B) Slicing  (C) Cutting	
(D) Trimming	
(2) 2	
8. Which of the following aspects is mainly concerned with molding the final shape around the basic skeleton?	
(A) Functional aspect (B) Operational aspect	
(C) Aesthetic aspect	
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9. The STL files translate the part geometry from a CAD system to	
(A) CNC machine	
(B) CMM machine (C) RP machine	
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10. In the process, one starts with a single block of solid material larger	
than the final size of the desired object and material is removed until the desired shape is reached.	
(A) Subtractive process	
(B) Additive process	
(C) Formative process	
(D) All of above	
11 Which of the following address of	
11. Which of the following addresses the need to design a product for safety?  (A) Soft-Hard Review	
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(C) Experimental design	
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(A) Fixed Development Modelling	
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13 The process of obtaining a geometric CAD	
13. The process of obtaining a geometric CAD model from 3D points acquired by scanning/digitizing existing parts/products is best known as:	
(A) Forward Engineering	
(B) Backward Engineering	
(C) Reverse Engineering	3
(D) Product Engineering	1

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14. In the entire reverse engineering proces	$_{ m is}$ for product design, which one is the $ m Hrst$
step?	

- (A) CAD model updating
- (B) CAD modeling
- (2)Data pre-processing
- (D) Data capturing

## 15. Which of the following RP system is not developed by 3D systems?

- (A) Selective Laser Sintering (SLS)
- (B) Multi-Jet Modeling System (MJM)
- (Q) Paper Lamination Technology (PLT)
- (D) Stereo lithography Apparatus (SLA)

### 16. Which of the following is used as base material in Stereolithography (SLA) process?

- (A) Thermoplastics, Metals powders
- (B) Thermoplastics, Eutectic metals.
- (C) Photopolymer
- (D) Titanium alloys

### 17. What is the third step in Reverse Engineering?

- (A) Digitization of the object
- (P) Creation of CAD model
- (C) Prototype
- (D) None of these

### 18. Which of the following advantage does not possess by the rapid prototyping process over the traditional prototyping process?

- (A) It consumes less time
- (B) Gives better quality
- (C) Reduces product launch time
- (D)/It's cheaper

### 19. Which kind of laser is used to cut the sheets in LOM?

- (A) Ruby Laser
- (B) Carbon Dioxide Laser
- (e) He-Ne Laser
- (D) None of these

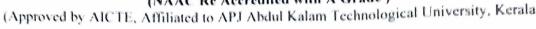
### 20. STL file format is represented by interaction of \_\_\_

- (A) lines and hexagons
- (B) lines and rectangles
- (C) lines and triangles
- (D) lines and circles

Page 3 of 4



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21.	Which	among	the	following	processes,	is	most	important	part	of	product
	elopmen				-						

- (A) Packaging
- (B) Purchasing
- (C) Engineering Design Process
- (D) Marketing

### 22. Which material can be efficiently used as a support material?

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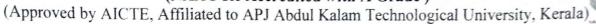
- (A) Mass properties of the model
- (B) Geometrical data
- (C) Drawing data
- (D) all of the above

### 25. To meet the customer's demand in today's market, we need:

- (A) Rapid Manufacturing
- (B) Conventional Manufacturing
- (C) Unconditional Manufacturing
- (D) None of these



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### DEPARTMENT OF MECHANICAL ENGINEERING

### MARK LIST OF CERTIFICATE COURSE (2023-2024) (ODD SEM)

### COURSE NAME: ADDITIVE MANUFACTURING

S. No	Reg No	Name	Semester	Year	Marks (50)
1.	NCE22ME001	ABHIJITH S	3	II	41
2.	NCE22ME002	ABILASH SHARMA	3	II	39
3.	NCE22ME003	AJMAL P	3	II	45
4.	NCE22ME004	AKHIL K S	3	II	45
5.	NCE22ME005	ATHULKRISHNA J	3	II	38
6.	NCE22ME006	AVINKUMAR P S	3	II	40
7.	NCE22ME007	KRISHNANUNNI P.S	3	II	46
8.	NCE22ME008	NEERAJ K	3	II	45
9.	NCE22ME009	PRAJITH K NAIR	3	II	38
10.	NCE22ME011	SREERAJ E H	3	II	39
11.	LNCE22ME012	SANJAY T S	3	II	44
12.	LNCE22ME013	SAYOOJ K R	3	II	44
13.	LNCE22ME014	YEDUKRISHNAN T	3	II	46
14.	NCE21ME002	ABHIJITH R	5	III	41
15.	NCE21ME003	АЛТН К	5	III	44
16.	NCE21ME004	ASWIN P	5	III	43
17.	NCE21ME005	HARIKRISHNAN K MENON	5	III	40
18.	NCE21ME007	K ABHIJITH	5	III	42
19.	NCE21ME008	KRISHNAJITH U	5	III	38
20.	NCE21ME011	SIDHARTH P	5	III	46
21.	NCE21ME012	SINGITH SAJI	5	III	42
22.	NCE21ME013	SURAJ R	5	III	39
23.	NCE20ME001	ADHITHYAN M A	7	IV	41
24.	NCE20ME002	AKASH MENON P	7	IV	38
25.	NCE20ME004	ARJUN P V	7	IV	45
26.	NCE20ME006	P S ARJUN NARAYAN	7	IV	45
27.	NCE20ME007	SRUTHIN C	7	IV	38
28.	NCE20ME008	S SAIKIRAN	7	IV	42
29.		YADHUKRISHNA K U	7	IV	44
30.		YASWANTH K	7	IV	43
31.		YOUNUS A Y	7	IV	39
32.	LNCE20ME013	AJITH KANNA	7	IV	45

Course Coordinator

Head of the Department

La fuoisan



# CERTIFICATE

OF COMPLETION

This certificate is proudly presented to



Since 1968

## YADHUKRISHNA KU

30000

had successfully completed Add on Course - Additive Manufacturing Processes during the academic year 2023-2024 conducted by Department of Mechanical Engineering at Nehru College of Engineering and Research Centre, Pampady, Thrissur.

**Program Coordinator** 

**Head of the Department** 

Made for free with Certify'em

Certificate ID U8WE8Y-CE000019



# CERTIFICATE

OF COMPLETION

This certificate is proudly presented to



## ABHISHEK M

9.00.6

had successfully completed Add on Course - Additive Manufacturing Processes during the academic year 2023-2024 conducted by **Department of Mechanical Engineering** at Nehru College of Engineering and Research Centre, Pampady, Thrissur.

**Program Coordinator** 

Head of the Department

Certificate ID U8WE8Y-CE000023



# CERTIFICATE

OF COMPLETION

This certificate is proudly presented to



## NEERAJ K N

95000

had successfully completed Add on Course - Additive Manufacturing Processes during the academic year 2023-2024 conducted by Department of Mechanical Engineering at Nehru College of Engineering and Research Centre, Pampady, Thrissur.

**Program Coordinator** 

Head of the Department

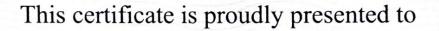
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Certificate ID U8WE8Y-CE000018



# CERTIFICATE

OF COMPLETION





Since 1968

## ATHULKRISHNA C

had successfully completed Add on Course - Additive Manufacturing Processes during the academic year 2023-2024 conducted by **Department of Mechanical Engineering** at Nehru College of Engineering and Research Centre, Pampady, Thrissur.

**Program Coordinator** 

Head of the Department

Made for free with Certify'em

**FROM** 

Ms. NEETHU M

ASSISTANT PROFESSOR

MTR DEPARTMENT, NCERC PAMPADY

TO

THE PRINCIPAL,

NCERC PAMPADY

Through HOD

Respected Mam,

SUBJECT: Requisition for conducting Certification Course on "IOT using ARDUINO" Reg.

Students need a deep understanding of upcoming methodologies to enhance knowledge dissemination for doing projects. IOT using ARDUINO based on combination of hardware and software provided that both should be synchronized with each other In this course students will be able to understand works in terms of physical board and libraries and the IDE(Integrated Development Environment), so Mechatronics Engineering department would like to conduct a Certification Course on "IOT using ARDUINO" from 17-07-2023. It will be a 30 hour course scheduled for February to May of this academic year 2022-2023. Kindly request you to give the permission for the same.

All UG Engineering students of MTR Department are eligible for this course.

Sincerely

PLACE: NEERC

DATE: 17/07/23

Nehru College Research Centre (Autonomous) Nila Gardens, Pampady

Thiruvilwamala, Thrissur - 680588

**FROM** 

MS NEETHU M

ASSISTANT PROFESSOR

MTR DEPARTMENT, NCERC PAMPADY

· TO

HEAD OF THE DEPARTMENT

MTR DEPARTMENT

.. NCERC PAMPADY

SUBJECT: Requisition for conducting Certification Course on "IOT using ARDUINQ" Reg.

Respected Mam,

As the Assistant Professor of Mechatronics Engineering, I would like to request your support and permission to conduct a certification course on "IOT using ARDUINO" from 17-07-2023. It will be a 30 hour course scheduled for February to May of this academic year 2023-2024. It is therefore important for students to have a deep understanding of upcoming methodologies to enhance knowledge dissemination to students for doing projects.

All UG Engineering students of MTR Department are eligible for this course.

Sincerely

PLACE: NCERC

DATE: 12/04/23

**FROM** 



La fusikan

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady Thiruvilwamala, Thrissur - 680588



PAMPADY, THIRUVILWAMALA, THRISSUR DIST, KERALA-680588



(Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

### DEPARTMENT OF MECHATRONICS ENGINEERING

The Department of Mechatronics Engineering is planning to conduct a 30 hour certificate course scheduled during the months; February to may of this a cademic year 2023-2024. The course is intended to be beneficial for students in their academics as well as professional life and therefore is offered to all S5 B.Tech Mechantronics Engineering students. All students are hereby directed to enroll in the course mandatorily.

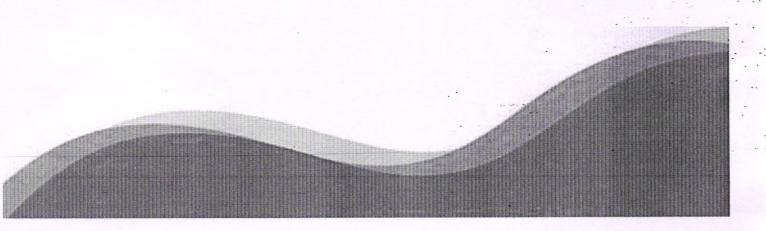
COURSE NAME : IOT using ARDUINO

PROGRAM CO-ORDINATOR: Ms. NEETHU M

Assistant Professor, Department of Mechatronics Engg.

DATE OF COMMENCEMENT: 17th JULY, 2023

COURSE DURATION : 30 Hours





Nehru College of Engineering and
Research Centre (Autonomous)
Iniruvilwamala, Thrissur - 680578



### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC Accredited)

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NCERC/3125/S/AC/09/23

### CIRCULAR

Subject: NCERC-Conduct of DAC&PAC meeting by all departments for the even semester of academic year 2023-24 Reg...

It is communicated to all department heads prior to the start of the upcoming even semester for APJKTU, which will begin in January. As a result, the Hods are requested to convene a meeting of the Department Advisory Committee (DAC) and the program Assessment Committee(PAC) before 20<sup>th</sup>Dec,2023 in order to continuously evaluate and enhance the program's outcomes in all domains of programme, academic, non-academic and accreditation process.

Copy to:

All Heads of the Departments, Faculty members, NBA coordinators, office superintend, Welfare officer, Work shop superintend, HR, Academic Superintend, Chairman and Managing Trustee.

PRINCIPAL

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady Thiruvilwamala, Thrissur - 680588



## NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC Accredited)



Pampady, Thiruvilwamala, Thrissur(DT)-680588 (Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

## DEPARTMENT OF MECHATRONICS DEPARTMENT ADVISORY COMMITTEE(DAC) MINUTES OF MEETING-20 /12/23

The Department Advisory committee (DAC) of the Mechatronics Engineering program was established on July 5,2016, with the goal of regularly reviewing the program outcomes in all academic, non-academic, and accrediting processes. The DAC had its meeting on Dec20/12/2023 in the board room Aryabhata block, NCERC, Pampady.

The meeting had started by 10:00 AM and the following faculty member, Academicians, Industrial persons and students' representatives had attended the meeting:

s.n	Designation	Name ,	
0		110 46 00 00 00 00 00 00 00 00 00 00 00 00 00	Attendan
			ce
1	Principal	Prof. (Dr). Karibasappa Kwadiki	- seinen
2	Head of the Department	Dr. Vijayakumar. K.	W.K.
3	Faculty Representatives from Department	Mr.Midhunraj P K Ms.Neethu M	3
4	Academic experts from other institutions/universi	Dr.Lalu,professor,GEC Thrissur	Twit.
	ties	spaniespo san kort sa saliab	hitching su
5	Industrial Experts	Mr.JevinGeorge,Mahindra&Mahindra,c hennai	ABSENT
6	Student Representatives	Ms.Smruthy Ranjith  Mr.Rajith Krishnan	OF THE PROPERTY OF THE PROPERT

PRINCIPAL

Nehru College of Engineering in Research Centre (Autonomous)

Nila Gardens, Pagoady Thiruvilwamala, Thrissur - 680 688

7	Alumini	Mr.RibinMathew	July.
	Representative	Mr.Ebin sunny	Low.
8	NBA Coordinator	MrMidhunraj P K	#

Dr.K G Vishwanadhan, Chairman of DAC starts the session with a silent prayer in honour of our beloved Founder chairman, LateSri.P.K.Das.The following points were discussed:

#### POINTS DISCUSSED

- 1.DAC recommend allfaculties tojoin in professional societies like IEEE,ISTE,IAENG Etc...
- 2. The committee reviewed the quality of design projects by S5 students and phase I projects of final years.
- 3. The committee went over the process of identifying slow learners and the remedial classes that were offered.

#### **ACTION TAKEN**

- 1. The remedial class registers were reviewed by DAC, and the slow learners class mentors were instructed to undertake slow learners counselling sessions in order to improve the results.
- 2. The committee made necessary modifications and recommended all class advisors to prepare individual attainments for each batch.
- 3.DAC recommend the department to create opportunities to students as well as faculties to join in professional societies like IEEE,ISTE,IAENG Etc...
- 4. The committee introduced a ADD-ON course" IOT using ARDUINO".

Secretary

PRINCIPAL
Nehru College of Engineering at
Research Centre (Autonomous
Nile Gerdens, Pampady
Thiruyilwamala, Thrissur - 680588

Chairman



### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC Accredited)



Pampady, Thiruvilwamala, Thrissur(DT)-680588 (Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

NCERC/3125/AC/ 09 /23

### **CIRCULAR**

Subject: NCERC-Conduct of DAC&PAC meeting by all departments for the ODD semester of academic year 2023-24Reg...

It is communicated to all department heads prior to the start of the upcoming odd semester for APJKTU, which will begin in August. As a result, the Hods are requested to convene a meeting of the Department Advisory Committee (DAC) and the program Assessment Committee(PAC) before 21<sup>nd</sup>JULY,2023 in order to continuously evaluate and enhance the program's outcomes in all domains of programme academic, non-academic and accreditation process.

Principal

Copy to:

All Heads of the Departments, Faculty members, NBA coordinators, office superintend, Welfare officer, Work shop superintend, HR, Academic Superintend, Chairman and Managing Trustee.

PRINCIPAL

Nehru College of Engineering and Research Centre (Autonomous) Nila Gardens, Pampady

Thiruvilwamala, Thrissur - 68070P



## NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE (NAAC Accredited)



Pampady, Thiruvilwamala, Thrissur (DT)-680588 (Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

## DEPARTMENT OF MECHATRONICS DEPARTMENT ADVISORY COMMITTEE(DAC) MINUTES OF MEETING- 22 /07 /23

The Department Advisory committee (DAC) of the Mechatronics Engineering program was established on July 5,2016, with the goal of regularly reviewing the program outcomes in all academic, non-academic, and accrediting processes. The DAC had its meeting on 22<sup>nd</sup> July,2023 in the board room Aryabhata block, NCERC ,Pampady.

The meeting had started by 10:00 AM and the following faculty member, Academicians, Industrial persons and students' representatives had attended the meeting:

s.n	Designation	Name	
0	emich de la		Attendan ce
1	Principal	Prof. (Dr), Karibasappa Kwadiki	Janes Carp
2	Head of the Department	Dr. vijayakumar, k.	123/11
3	Faculty Representatives from Department	Mr.Midhunraj P K Ms.Neethu M	4
4	Academic experts from other institutions/universi ties	Dr.Lalu,professor,GECThrissur	James Mills
5	Industrial Experts	Mr.JevinGeorge,Mahindra&Mahindra,c	ABSENT
6	Student Representatives	Ms.SmruthyRanjith  Mr.Rajith Krishnan	A Solvins

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Thiruvilwam-

Engineering and rusuran (Autonomous)

SSUT - GREATAR

7	Alumini	Mr.Ribin Mathew	XX.
	Representative	Mr.Ebin sunny	These
8	NBA Coordinator	Mr.Midhunraj P K	3/1

Dr.K G Vishwanadhan, Chairman of DAC starts the session with a silent prayer in honour of our beloved Founder chairman, LateSri.P.K.Das.The following points were discussed:

#### POINTS DISCUSSED

- 1. The committee examined how to implement and make all course outcomes known to students, as well as how to map them with Pos and PSOs using various platforms.
- 2. The committee discussed the quality of the content beyond the subjects and the circulation of the same.
- 3. The committee suggested conducting remedial class for slow learners.
- 4. The DAC also encouraged the s5 class advisor to encourage students to persue research oriented design projects in order to strengthen the department's R&D operations.
- 5. The committee also recommended that students use project.
- 6.Artificial intelligence Laboratory can be included.
- 7. Robotic operating system can be added for the upcoming semester to fill curricular gaps.
- 8. The committee examined the performance of department association and its related activities.

#### **ACTION TAKEN**

- 1. The committee reviewed students projects and advised faculty advisors to motivate students to do their projects in innovative areas.
- 2. The committee encouraged all faculties to upload the course materials in various digital platforms for students circulation, committee also suggest to include course outcomes, content beyond the syllabus etc... in the same.
- 3. The committee encouraged all class advisors to categorise students based on academic performance, give remedial classes for slow learners, and keep all appropriate departmental documentation on file.

4. The committee introduced a ADD-ON course "IOT using ARDUINO".

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SECRETARY CHAIRMAN

### SYLLABUS:

- 1. Introductionto IOT
  - UnderstandingIoTfundamentals
  - **IOTArchitectureandprotocols**
  - VariousPlatformsforIoT
  - RealtimeExamplesofIoT
  - OverviewofloTcomponentsandIoTCommunicationTechnologies
  - ChallengesinIOT

#### 2. ArduinoSimulation Environment

- ArduinoUnoArchitecture
- SetuptheIDE, WritingArduinoSoftware
- Arduino Libraries
- BasicsofEmbeddedCprogrammingforArduino
- InterfacingLED, pushbutton

#### 3. SensorandActuatorswithArduino

- OverviewofSensorsworking
- AnalogandDigitalSensors
- InterfacingofTemperature,Humidity,Motion, LightandGasSensorwith
- Arduino
- InterfacingofActuatorswithArduino.
- Interfacing of RelaySwitch and Servo MotorwithArduino

#### 4. BasicNetworkingwithESP8266 WiFimodule

- BasicsofWirelessNetworking
- IntroductiontoESP8266Wi-FiModule
- VariousWi-Filibrary
- Webserver-introduction,installation,configuration
- Postingsensor(s)data toweb server

#### 5. CloudPlatforms for IOT

- VirtualizationconceptsandCloudArchitecture
- Cloudcomputing, benefits
- Cloudservices -- SaaS, PaaS, IaaS
- Cloudproviders & offerings
- StudyofIOT Cloud platforms
- ThingSpeakAPIandMQTT
- InterfacingESP8266withWebservices

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Q.p with answer

### **IOT using ARDUINO**

- 1. Which of the following is NOT a key characteristic of IoT?
  - a) Real-time data collection
  - b) Remote control and monitoring
  - o c) High energy consumption
  - o d) Autonomous decision-making
- 2. Which IoT protocol is designed for low-power, low-bandwidth communication?
  - o a) HTTP
  - b) MQTT
  - o c) CoAP
  - o d) FTP
- 3. What is the purpose of the IoT architecture layer called the "Perception Layer"?
  - o a) Collects data from physical sensors
  - b) Processes data in real-time
  - c) Stores data in a cloud platform
  - o d) Secures communication between devices
- 4. Which of the following is a real-time example of IoT?
  - a) Social media platforms
  - b) Smart thermostats
  - o c) Email services
  - o d) Video streaming apps
- 5. Which of the following is a challenge faced in IoT implementations?
  - o a) Excessive network bandwidth
  - b) Data security and privacy issues
  - c) Unavailability of cloud storage
  - d) Lack of cloud computing infrastructure
- 6. Which of the following components is found in the Arduino Uno architecture?
  - a) ARM Cortex processor
  - o. b) AVR microcontroller
  - o c) Raspberry Pi processor
  - d) ESP32 microcontroller
- 7. Which tool is used to write and upload code to an Arduino board?
  - o a) Arduino IDE
  - o b) MATLAB
  - ∘ c) Python
    - o d) Visual Studio Code

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## 8. In Arduino programming, which of the following is a standard function?

- o a) setup()
- b) execute()
- o c) process()
- o d) start()

### 9. What is the purpose of Arduino libraries?

- o a) To interact with external hardware components
- o b) To write complex code from scratch
- o c) To modify the Arduino hardware
- o d) To connect Arduino to the internet

## 10. Which programming language is primarily used for Arduino development?

- · a) Python
- b) Embedded C
- · c) Java
- d) JavaScript

### 11. Which of the following sensors is used to measure temperature?

- · a) PIR sensor
- b) LM35 sensor
- c) MQ-2 sensor
- · d) Photoresistor

### 12. What is the main difference between analog and digital sensors?

- a) Analog sensors output continuous signals, while digital sensors output discrete signals
- b) Analog sensors are less accurate than digital sensors
- c) Analog sensors require more power than digital sensors
- d) Digital sensors require more calibration than analog sensors

### 13. What is the purpose of a relay switch in an IoT system?

- a) To convert digital signals to analog signals
- b) To control high-voltage devices with low-voltage signals
- c) To measure environmental conditions
- d) To store sensor data

14. Which actuator is commonly used to control position or movement in IoT systems?

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- · a) Servo motor
- · b) Humidity sensor
- c) Motion detector
- d) Photoresistor

### 15. Which sensor is commonly used to detect motion?

- a) Temperature sensor
- b) Light sensor
- c) PIR (Passive Infrared) sensor
- · d) Gas sensor

### 16. What does the ESP8266 Wi-Fi module allow an Arduino to do?

- a) Control servo motors
- b) Connect to the internet and send/receive data
- c) Read sensor data
- · d) Interface with displays

## 17. Which of the following is a common use of the ESP8266 module in IoT?

- · a) Temperature sensing
- b) Wireless communication with cloud services
- c) Lighting control
- · d) Motion detection

## 18. Which protocol is commonly used with the ESP8266 for web communication?

- a) FTP
- b) MQTT
- c) HTTP
- · d) SMTP

## 19.In an IoT system using the ESP8266, what is a common way to send sensor data to a web server?

- a) Using serial communication
- b) Sending data via Wi-Fi using HTTP POST requests
- c) Using infrared signals
- d) Transmitting data through Bluetooth

20. What does the ESP8266 module require for configuration?

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- a) A Bluetooth module
- b) An internet connection for programming
- c) A mobile app for configuration
- d) A microcontroller (e.g., Arduino)

### 21. Which of the following is a benefit of cloud computing in IoT?

- a) Faster processing on local devices
- b) Storage and processing of large amounts of sensor data
- · c) Limited access to sensor data
- d) Lack of internet connectivity

# 22. Answer: Which cloud service model provides virtual machines and storage, allowing users to manage operating systems and applications?

- a) SaaS
- b) IaaS
- · c) PaaS
- d) DaaS

## 23. Which of the following is a popular cloud platform for IoT applications?

- a) Amazon Web Services (AWS)
- b) Google Earth
- · c) Microsoft Word
- d) Adobe Photoshop

### 24. What does the ThingSpeak API allow IoT devices to do?

- a) Run machine learning algorithms
- b) Post sensor data to the cloud and visualize it
- · c) Control local devices
- d) Connect to Bluetooth peripherals

### 25. Which of the following is a key feature of MQTT in IoT systems?

- a) It requires a large amount of bandwidth
- b) It uses a publisher-subscriber model for lightweight messaging
- c) It is not suitable for mobile devices
- d) It is not secure

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- 26. Which cloud service model is most appropriate for developers who want to focus only on application development without worrying about infrastructure management?
- a) PaaS
- b) IaaS
- c) SaaS
- d) DaaS
- 27. Which type of data is typically sent from IoT devices to cloud platforms?
- a) Video data
- b) Large binary files
- c) Sensor readings (e.g., temperature, humidity)
- d) Audio recordings
- Answer
- 28. Which of the following is a popular method for interfacing IoT devices with cloud services?
- a) Direct file transfer via USB
- b) Bluetooth communication
- c) Using a REST API or HTTP requests
- d) Serial communication over RS232
- 29. AnswerWhat is a key advantage of using cloud platforms for IoT applications?
- a) Reduces hardware requirements on local devices
- b) Limits data storage to a local device
- c) Makes IoT devices more expensive
- d) Increases the need for physical infrastructure
- 30. Which of the following is a challenge when using cloud platforms for IoT?
- a) Increased local storage space
- b) Limited internet connectivity for devices
- c) Simplified hardware interfacing
- d) Decreased data processing speed

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#### **ANSWERS**

- 1)c) High energy consumption
- 2)c) CoAP
- 3)a) Collects data from physical sensors
- 4)b) Smart thermostats
- 5)b) Data security and privacy issues
- 6)b) AVR microcontroller
- 7)a) Arduino IDE
- 8)a) setup()
- 9)a) To interact with external hardware components
- 10)b) Embedded C
- 11)b) LM35 sensor
- 12)a) Analog sensors output continuous signals, while digital sensors output discrete signals
- 13)b) To control high-voltage devices with low-voltage signals
- 14)a) Servo motor
- 15)c) PIR (Passive Infrared) sensor
- 16)b) Connect to the internet and send/receive data
- 17) b) Wireless communication with cloud services
- 18)c) HTTP
- 19)b) Sending data via Wi-Fi using HTTP POST requests
- 20)d) A microcontroller (e.g., Arduino)
- 21)b) Storage and processing of large amounts of sensor data
- 22)b) IaaS
- 23)a) Amazon Web Services (AWS)

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- 24)b) Post sensor data to the cloud and visualize it
- 25)b) It uses a publisher-subscriber model for lightweight messaging
- 26) a) PaaS
- 27) c) Sensor readings (e.g., temperature, humidity)
- 28) c) Using a REST API or HTTP requests
- 29)a) Reduces hardware requirements on local devices
- 30)b) Limited internet connectivity for devices

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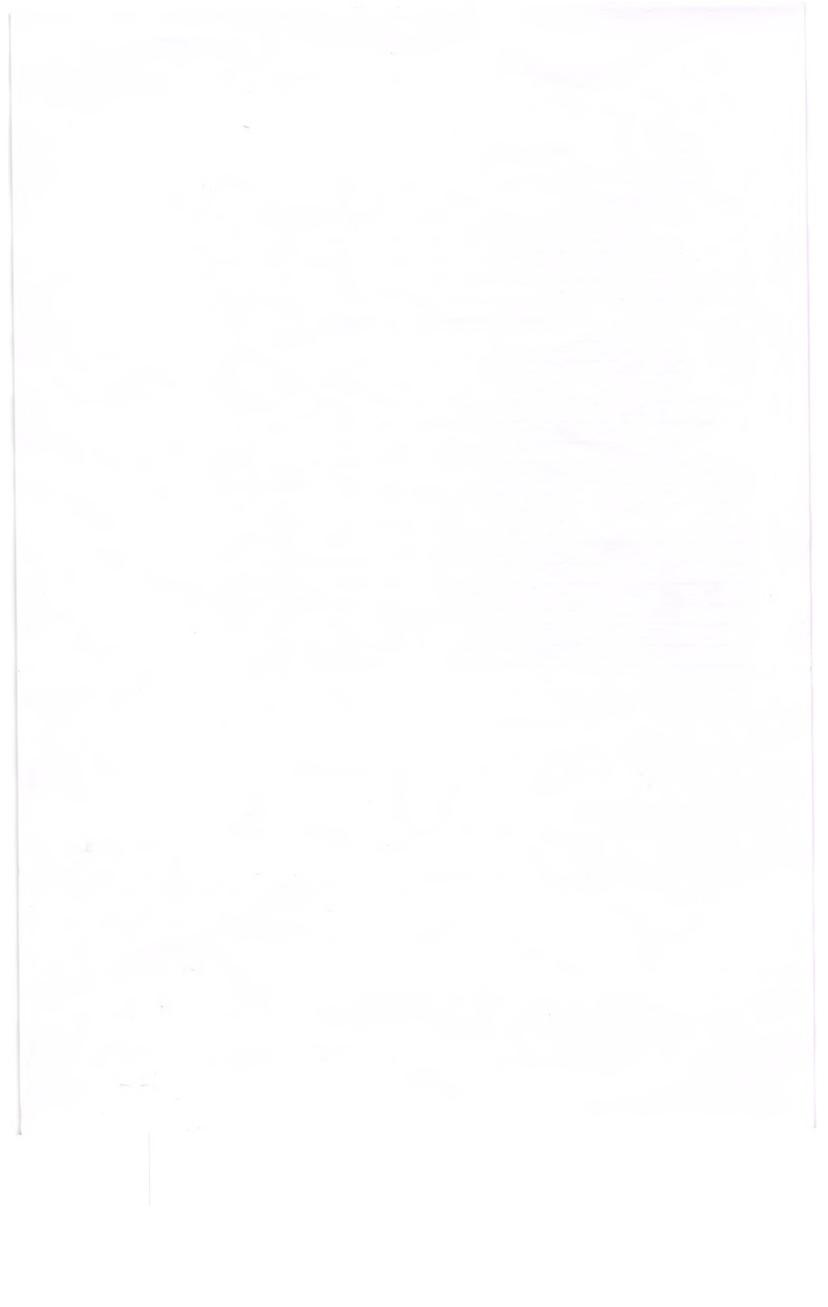
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### **IOT using ARDUINO**

- 29.
- 1. Which of the following is NOT a key characteristic of IoT?
  - o a) Real-time data collection
  - o b) Remote control and monitoring

  - o d) Autonomous decision-making
- 2. Which IoT protocol is designed for low-power, low-bandwidth communication?
  - o a) HTTP
  - o b) MQTT
  - √ c) CoAP
  - o d) FTP
- 3. What is the purpose of the IoT architecture layer called the "Perception Layer"?
  - √ a) Collects data from physical sensors
    - o b) Processes data in real-time
    - o c) Stores data in a cloud platform
    - o d) Secures communication between devices
- 4. Which of the following is a real-time example of IoT?
  - o a) Social media platforms

  - o c) Email services
  - o d) Video streaming apps
- 5. Which of the following is a challenge faced in IoT implementations?
  - o , a) Excessive network bandwidth
  - √ b) Data security and privacy issues
  - o c) Unavailability of cloud storage
  - o d) Lack of cloud computing infrastructure
- 6. Which of the following components is found in the Arduino Uno architecture?
  - o/a) ARM Cortex processor
  - √ b) AVR microcontroller
  - o c) Raspberry Pi processor
  - o d) ESP32 microcontroller
- 7. Which tool is used to write and upload code to an Arduino board?

  - o b) MATLAB
  - o c) Python
  - o d) Visual Studio Code

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## **IOT using ARDUINO**

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Nehru College of Engine of Research Centre (Autonompus)

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  - o c) Unavailability of cloud storage
    - o d) Lack of cloud computing infrastructure
- 6. Which of the following components is found in the Arduino Uno architecture?
  - o a) ARM Cortex processor
  - √ b) AVR microcontroller
    - o c) Raspberry Pi processor
    - o d) ESP32 microcontroller
- 7. Which tool is used to write and upload code to an Arduino board?
  - √ a) Arduino IDE
    - o b) MATLAB
    - o c) Python
    - o d) Visual Studio Code

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- 8. In Arduino programming, which of the following is a standard function? (a) setup() o b) execute()
  - o c) process()
  - o d) start()
- 9. What is the purpose of Arduino libraries?
  - ✓ a) To interact with external hardware components
    - o b) To write complex code from scratch
    - o c) To modify the Arduino hardware
    - o d) To connect Arduino to the internet
- 10. Which programming language is primarily used for Arduino development?
- a) Python
- b) Embedded C
- c) Java
- d) JavaScript
- 11. Which of the following sensors is used to measure temperature?
- \( \sigma \) PIR sensor
- b) LM35 sensor
- c) MQ-2 sensor
- d) Photoresistor
- 12. What is the main difference between analog and digital sensors?
- a) Analog sensors output continuous signals, while digital sensors output discrete signals
  - b) Analog sensors are less accurate than digital sensors
  - c) Analog sensors require more power than digital sensors
  - d) Digital sensors require more calibration than analog sensors
  - 13. What is the purpose of a relay switch in an IoT system?
  - a) To convert digital signals to analog signals
  - b) To control high-voltage devices with low-voltage signals
- c) To measure environmental conditions
  - d) To store sensor data

14. Which actuator is commonly used to control position or movement in IoT systems?

- · a) Servo motor
- b) Humidity sensor
- c) Motion detector
- d) Photoresistor

#### 15. Which sensor is commonly used to detect motion?

- a) Temperature sensor
- b) Light sensor
- c) PIR (Passive Infrared) sensor
  - · d) Gas sensor

#### 16. What does the ESP8266 Wi-Fi module allow an Arduino to do?

- a) Control servo motors
- **b)** Connect to the internet and send/receive data
  - c) Read sensor data
  - · d) Interface with displays

## 17. Which of the following is a common use of the ESP8266 module in IoT?

- a) Temperature sensing
- ✓ b) Wireless communication with cloud services
  - c) Lighting control
  - d) Motion detection

## 18. Which protocol is commonly used with the ESP8266 for web communication?

- a) FTP
- b) MQTT
- •/ c) HTTP
- å d) SMTP

## 19.In an IoT system using the ESP8266, what is a common way to send sensor data to a web server?

- a) Using serial communication
- b) Sending data via Wi-Fi using HTTP POST requests
  - c) Using infrared signals
  - d) Transmitting data through Bluetooth

20. What does the ESP8266 module require for configuration?

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- a) A Bluetooth module
- b) An internet connection for programming
  - c) A mobile app for configuration
- d) A microcontroller (e.g., Arduino)

#### 21. Which of the following is a benefit of cloud computing in IoT?

- a) Faster processing on local devices
- b) Storage and processing of large amounts of sensor data
  - c) Limited access to sensor data
- d) Lack of internet connectivity
- 22. Answer: Which cloud service model provides virtual machines and storage, allowing users to manage operating systems and applications?
- a) SaaS
- b) IaaS
  - c) PaaS
  - d) DaaS
  - 23. Which of the following is a popular cloud platform for IoT applications?
- å a) Amazon Web Services (AWS)
  - b) Google Earth
  - c) Microsoft Word
  - d) Adobe Photoshop

#### 24. What does the ThingSpeak API allow IoT devices to do?

- a) Run machine learning algorithms
- b) Post sensor data to the cloud and visualize it
  - c) Control local devices
  - d) Connect to Bluetooth peripherals

#### 25. Which of the following is a key feature of MOTT in IoT systems?

- a) It requires a large amount of bandwidth
- b) It uses a publisher-subscriber model for lightweight messaging
- c) It is not suitable for mobile devices
- d) It is not secure

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PROGRAM CO-ORDINATOR

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#### Nehru College of Engineering and Research Centre MBA-2023-2025

PASSED/FAILED
Passed
Fail
Passed
Passed
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31	NCE23MBA31	NANDHANA M	Leadership for india inc:practical concepts and constructs	20-04-2024	Passed
32	NCE23MBA32	NIMISHA U	Financial statement analysis and reporting	20-04-2024	Passed
33	NCE23MBA33	NIMSHIYA N	Education for Sustainable Development	21-04-2024	PASSED
34	NCE23MBA34	POOJA PRABHA P	Leader and team effectiveness	27-04-2024	passed
35	NCE23MBA35	PRAJEESH KUMAR	Leadership and team effectiveness	27-04-2024	Passed
36	NCE23MBA36	PRENEESH P U	Leadership and team effectiveness	27-04-2024	Fail
37	NCE23MBA37	RAJANA P	Leadership and team effectiveness	27-04-2024	Passed
38	NCE23MBA38	RANAFATHIMA T D	Leadership and team effectiveness	27-04-2024	passed
39	NCE23MBA39	RISANA K	Leadership and team effectiveness	27-04-2024	passed
40	NCE23MBA40	ROHINI S	Al in marketing	27-04-2024	Passed
41	NCE23MBA41	SAJITH K	Leadership and team effectiveness	27-04-2024	Passed
42	NCE23MBA42	SHENIYA M	Leadership and team effectiveness	27-04-2024	Failed
43	NCE23MBA43	SHYAM PRAKASH	Leadership and team effectiveness	27-04-2024	Passed
44	NCE23MBA44	SIBILFARHAN V A	Leadership and team effectiveness	27-04-2024	Passed
45	NCE23MBA45	SILPA M J	Leadership and team effectiveness	27-04-2024	passed
46	NCE23MBA46	* SIYA S	Leadership And Team effectiveness	27-04-2024	Passed
47	NCE23MBA47	SMRUTHI K	Leadership and Team Effectiveness	27-04-2024	Passed
48	NCE23MBA48	SONA N	Financial statement analysis and reporting	20-04-2025	passed
49	NCE23MBA49	SOORAJ S	Leadership and Team effectiveness	27-04-2024	Failed
50	NCE23MBA50	SOWMYA M	Leadership and team effectiveness	27-04-2024	passed
51	NCE23MBA51	SRADHA LAKSHMI P S	Leadership and team effectiveness	27-04-2024	Passed
52	NCE23MBA52	SREEJITHA K	Financial statement analysis and reporting	20-04-2024	passed
53	NCE23MBA53	SREELAKSHMI V S	financian statement analysis & reporting	20-04-2024	Passed
54	NCE23MBA54	SREELEKHA P	Leadership and team effectiveness	27-04-2024	Passed
55	NCE23MBA55	SREERAM K	Leadership And Team effectiveness	27-04-2024	PASSED
56	NCE23MBA56	SURAJ S NAIR	modelling and analytics of supply chain management	27-04-2024	Passed
57	NCE23MBA57	VAISAK BALAN NAIR	Leadership and team effectiveness	27-04-2024	Passed
58	NCE23MBA58	VIDYA P V	Leadership and Team Effectuveness	27-04-2024	failed
59	NCE23MBA59	la Gardens VINITHA P V	Leadership and team effectiveness	27-04-2024	passed
60	NCE23MBA60	V MAHESH MOHAN	Leadership and team effectiveness	27-04-2024	passed

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# NPTEL Online Certification (Funded by the MoE, Govt. of India)

This certificate is awarded to

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for successfully completing the course

#### Financial Statement Analysis and Reporting

with a consolidated score of

55

Online Assignments | 20.1/25

Proctored Exam 34.5/75

Total number of candidates certified in this course: 849

Prof. Kaushik Ghosh, Professor(Chemistry) Coordinator CEC

Jan-Apr 2024 (12 week course) Prof. Ranjana Pathania, Professor (BSBE) Coordinator (NPTEL)



Indian Institute of Technology Roorkee

Roll No: NPTEL24MG22S364100035

To verify the certificate



No. of credits recommended: 3 or 4





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This certificate is awarded to

#### **ANUGRAHA A**

for successfully completing the course

## Leadership and Team Effectiveness

with a consolidated score of

61

%

Online Assignments | 23.44/25 | Proctored Exam | 37.5/75

Total number of candidates certified in this course: 7482

Prof. Kaushik Ghosh. Professor(Chemistry) Coordinator CEC



Jan-Apr 2024

(12 week course)

Prof. Ranjana Pathania, Professor (BSBE) Coordinator (NPTEL)



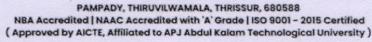
Indian Institute of Technology Roorkee





#### NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

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#### **DEPARTMENT OF MCA- ACADEMIC YEAR 2023-24**

#### Minutes of Meeting conducted on 27/10/2023

- 1. Principal's approval dt.06<sup>th</sup> 17<sup>th</sup> November 2023 for Value Added courses
- 2. Topic of VA Course is fixed as Importance of Digital Marketing and E-Commerce
- 3. The syllabus may cover various sections related to Digital Marketing and E-Commerce activities
- 4. Class tutors must motivate the students to take the course seriously
- 5. Evaluation may be done through Quiz, Written Exams and Group activities
- 6. Certificates for successful students may be provided

#### Coordinator - VA Courses-MCA

**Faculty Attendees** 

Dr.Sudheer.S.Marar

Pramod K

Divya M

Student Attendees

Mridula

Arun Suresh

Vismaya

Unnimaya

Mila Gardens

Mila Gardens

Pampsdy
Thiruvilwamala
Thrissur - 639588

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M.C.A.



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#### **DEPARTMENT OF MCA**

#### **CIRCULAR**

This is to inform you that the Department of MCA is conducting value added course on Importance of Digital Marketing and E-Commerce 06/11/23 to 17/11/23. Attendance is compulsory.

Pampady

30/10/23

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# **DEPARTMENT OF MCA**

PRESENTS

# VALUE ADDED PROGRAM

Importance of Digital Marketing and E-Commerce

#### DATE

06TH - 17TH NOVEMBER 2023

RESOURCE PERSON

SREEJITH K.

RESEARCH AND DEVELOPMENT ENGINEER AT LUMINAR TECHNOLAB

VENUE

KAPILA BLOCK, NCERC

For enquiries contact Coordinator Pramod K

the

9447068556

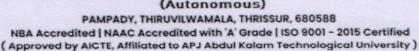
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#### **DEPARTMENT OF MCA - ACADEMIC YEAR 2023-24**

### SYLLABUS IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE

06th - 17th November 2023

#### Unit 1: Introduction to Digital Marketing

Introduction to Digital Marketing: Evolution of digital Marketing, Traditional vs Digital Marketing, Digital Marketing Channels, Digital Marketing Plan, Digital Marketing Strategy, Digital Marketing Application and Benefits, Digital Marketing in India

#### Unit 2: Consumer and Digital Marketing

The Consumer and Digital Marketing: Consumer Behaviour on internet, Impact of Digital Technology on Consumer Behaviour, Attributes of online buying behaviour, Marketing Intelligence from user's online data understanding consumer demands, brand building on web.

#### Unit 3: Social Media Marketing

Social Media Marketing: Social Networking, Objectives of Social Media Stratergy, Building social media strategy, Types of Social media marketing, Facebook marketing, LinkedIn marketing, Instagram marketing, You tube Marketing, Twitter Marketing.

#### Unit 4: Intrusion Detection and Prevention

Introduction to E- commerce: Meaning and concept, E-commerce v/s Traditional Commerce, E-Business & E- Commerce History of E-Commerce - EDI - Importance, features & benefits of E-Commerce - Impacts, Challenges & Limitations of E-Commerce, Supply chain management & E -Commerce – E – Commerce infrastructure.

#### Unit 5: Marketing strategies & E - Commerce

Website, components of website, Concept & Designing website for E- Commerce, Corporate. Website, Portal, Search Engine - Internet. Advertising - Emergence of the internet as a competitive advertising media, Models of internet advertising, Weakness in Internet advertising, Mobile Commerce

#### Unit 6: Electronic payment system & Security

Electronic payment system, E-Banking-Concept, operations, online fund transfer-RTGC, ATM, etc. Security issues in E-Commerce-Regulatory framework of E-commerce.





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# DEPARTMENT OF MCA - ACADEMIC YEAR 2023-24 SCHEDULE OF IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE

06<sup>th</sup> - 17<sup>th</sup> NOVEMBER 2023

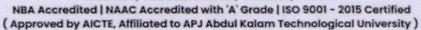
No.	Date	Portions Covered
1	06	Introduction to Digital Marketing
2	07	Digital Marketing Application
3	08	Digital Marketing in India
4	09	Consumer and Digital Marketing
5	10	Marketing Intelligence
6	13	Introduction to E-Commerce
7	14	Business Models in E-Commerce
8	15	Electronic Payment System
9	16	Marketing strategies & E – Commerce
10	17	Security issues in E–Commerce







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## **DEPARTMENT OF MCA - ACADEMIC YEAR 23-24** ATTENDANCE FOR ADD-ON PROGRAM "IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE"

06<sup>th</sup> - 17<sup>th</sup> Nov 2023

1 ABHISHEK C V	NO.	NAME	06	07	08	09	10	13	14	15	16	17
3 ABIN R NAIR 4 ADHRIJA T S 5 AISWARYA G 6 AJMAL V M 7 ALTHAF N 8 AMANYURAG S 9 A M MOHAMMED FARHAN 10 ANJANA V S 11 ANJIMA A M 12 ANJU R 13 ANOOP KRISHNAN P 14 ANUPAMA N 15 ANURAG N K 16 APARNA DAS S 17 ARIFA O K 17 ARIFA O K 18 ARJUN C 19 ARUN SURESH 20 ASHISH T A 21 ASHUN JAMES 22 ASNA A T 23 ASWANI M P 24 ASWIN SHIBU 26 BHAVANA K N 27 A 27 ALTHAF N 27 A ADRIN A A A A A A A A A A A A A A A A A A A	1	ABHISHEK C V	1	1	1	1	1	1	1	1	1	1
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21       ASHLIN JAMES       / / / / / / / / / / / / /         22       ASNA A T       / / / / / / / / / / / / / / / / / /         23       ASWANI M P       / / / / / / / / / / / / / / / / / / /	19	ARUN SURESH	1	1	1	1	1	1	1	1	1	1
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30	JISHNU S	1	1	1	1	1	1	1	1	1	1
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33	MALAVIKA M	1	1	1	1	1	1	1	1	1	1
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36	MOHAMMED SADHIK M S	1	1	1	1	1	1	1	1	1	1
37	MRIDULA M	1	1	1	1	1	1	1	1	1	1
38	NANDANA C	1	1	1	1	1	1	1	1	1	1
39	NASRIN M	1	1	1	1	1	1	1	1	1	1
40	NIHANA SIDHIK	1	1	1	1	1	1	1	1	1	1
41	NIMYA S	1	1	1	1	1	1	1	1	1	1
42	PRANAV SUNNY	1	1	1	1	1	1	1	1	1	1
43	RAMSEENA CP	1	1	1	1	1	1	1	1	1	1
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50	SARANATH U	1	1	1	1	1	1	1	1	1	1
51	SHABINA V	1	1	1	1	1	1	1	1	1	1
52	SHAFEENA K I	1	1	1	1	1	1	1	1	1	1
53	SHYAMSANKAR T	1	1	1	1	1	1	(	1	1	/
54	SOBHITHA S P	1	1.	1	1	1	1	1	1	1	1
55	SREEDHANYA T S	1	1	1	1	1	1	1	1	1	1
56	SREEMA R	1	1	1	1	1	1	1	1	1	/
57	SUJINA E S	1	1	1	1	1	1	1	1	1	,
58	UNNI MAYA V	1	1	1	1	1	1	1	1	1	1
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#### **DEPARTMENT OF MCA**

#### **ACADEMIC YEAR 2023-24**

#### IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE QUESTION PAPER

1,	social media,	mobile apps,	and oth	ner dig	gital	channels	are all	examples	of d	igital	marketi	ing
used by	companies an	d companies.										

- A. Search Engines
- B. Websites
- C. Emails
- D. All of the above
- 2. \_\_\_\_ are used in digital marketing.
  - A. Electronic devices
  - B. Internet
  - C. Both A and B
  - D. None of the above
- 3. \_\_\_\_ is/are the main component(s) of digital marketing.
  - A. SEO
  - B. SMO
  - C. SEM
  - D. All of the above

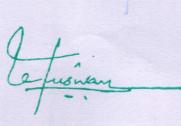
#### 4. What is the full form of SEO?

- A. Search Engine Optimal
- B. Social Engine Optimization
- C. Search Engine Optimization
- D. Social Engine Optimal

#### 5. What is the full form of SEM?

- A. Social Engine Marketing
- B. Search Engine Marketing
- C. Search Engine Management
- D. Social Engine Management
- 6. What is the full form of SMO?
  - A. Social Media Optimal
  - B. Search Media Optimal
  - C. Search Media Optimization
  - D. Social Media Optimization







- 7. The important On-Page SEO factor(s) is/are -
  - A. Meta Tags
  - B. Sitemap
  - C. Canonical Tag
  - D. All of the above
- 8. Which of the following describes e-commerce?
  - A. Doing business electronically
  - B. Doing business
  - C. Sale of goods
  - D. All of the above
- 9. The best products to sell in B2C e-commerce are:
  - A. Small products
  - B. Digital products
  - C. Specialty products
  - D. Fresh products
- 10. Digital products are best suited for B2C e-commerce because they:
  - A. Are commodity like products
  - B. Can be mass-customized and personalized
  - C. Can be delivered at the time of purchase
  - D. All of the above
- 11. How the transactions occur in e-commerce?
  - A. Using e-medias
  - B. Using computers only
  - C. Using mobile phones only
  - D. None of the above



- 12. Which of the following refers to creating products tailored to individual customers?
  - A. customization
  - B. aggregation
  - C. Direct materials
  - D. Reverse auction
- 13. Which factor determines who has the right to access different types of IT systems and information?
  - A. Availability

- B. Accessibility
- C. Reliability
- D. Scalability
- 14. Which is not a function of ERP?
  - A. Warehousing
  - B. sales
  - C. scheduling
  - D. None of the above
- 15. In mobile marketing, the full form of LBS is \_\_\_\_\_
  - A. Location-based service
  - B. List-based service
  - C. Lead-based service
  - D. None of the above



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ACADEMI	C YEAR 23-24
IMPORTANCE OF DIGITAL M	MARKETING AND E-COMMERCE
<ol> <li>, social media, mobile apps, and other digitated by companies and companies. D</li> <li>A. Search Engines</li> <li>B. Websites</li> <li>C. Emails</li> <li>D. All of the above</li> <li> are used in digital marketing. C</li> <li>A. Electronic devices</li> <li>B. Internet</li> <li>C. Both A and B</li> <li>D. None of the above</li> </ol>	ital channels are all examples of digital marketing
3 is/are the main component(s) of digital m A. SEO B. SMO C. SEM D. All of the above	arketing. D
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n	4

5. What is the full form of SEM? 3

A. Social Engine Marketing

B. Search Engine Marketing

C. Search Engine Management

D. Social Engine Management

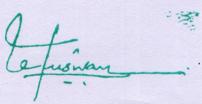
6. What is the full form of SMO?

A. Social Media Optimal

B. Search Media Optimal

C. Search Media Optimization







# D. Social Media Optimization

7. The important On-Page SEO factor(s) is/are - C

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#### **DEPARTMENT OF MCA**

**ACADEMIC YEAR 23-24** 

## IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE ANSWER KEY

- 1. \_\_\_\_\_, social media, mobile apps, and other digital channels are all examples of digital marketing used by companies and companies.
  - A. Search Engines
  - B. Websites
  - C. Emails
  - D. All of the above

Answer: D) All of the above

- 2. are used in digital marketing.
  - A. Electronic devices
  - B. Internet
  - C. Both A and B
  - D. None of the above

Answer: C) Both A and B

- 3. \_\_\_\_ is/are the main component(s) of digital marketing.
  - A. SEO
  - B. SMO
  - C. SEM
  - D. All of the above

Answer: D) All of the above

- 4. What is the full form of SEO?
  - A. Search Engine Optimal
  - B. Social Engine Optimization
  - C. Search Engine Optimization
  - D. Social Engine Optimal

Answer: C) Search Engine Optimization

- 5. What is the full form of SEM?
  - A. Social Engine Marketing
  - B. Search Engine Marketing
  - C. Search Engine Management
  - D. Social Engine Management

Answer: B) Search Engine Marketing



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- 6. What is the full form of SMO?
  - A. Social Media Optimal
  - B. Search Media Optimal
  - C. Search Media Optimization
  - D. Social Media Optimization

# Answer: D) Social Media Optimization

- 7. The important On-Page SEO factor(s) is/are -
  - A. Meta Tags
  - B. Sitemap
  - C. Canonical Tag
  - D. All of the above

Answer: D) All of the above

- 8. Which of the following describes e-commerce?
  - A. Doing business electronically
  - B. Doing business
  - C. Sale of goods
  - D. All of the above

Answer: A

- 9. The best products to sell in B2C e-commerce are:
  - A. Small products
  - B. Digital products
  - C. Specialty products
  - D. Fresh products

Answer: B

- 10. Digital products are best suited for B2C e-commerce because they:
  - A. Are commodity like products
  - B. Can be mass-customized and personalized
  - C. Can be delivered at the time of purchase
  - D. All of the above

Answer: D

- 11. How the transactions occur in e-commerce?
  - A. Using e-medias
  - B. Using computers only
  - C. Using mobile phones only
  - D. None of the above

Answer: A

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- 12. Which of the following refers to creating products tailored to individual customers?
  A. customization
  B. aggregation
  C. Direct materials
  D. Reverse auction

  Answer: A
- 13. Which factor determines who has the right to access different types of IT systems and information?
  - A. Availability
  - B. Accessibility
  - C. Reliability
  - D. Scalability

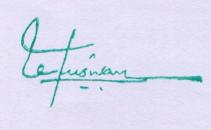
Answer: B

- 14. Which is not a function of ERP?
  - A. Warehousing
  - B. sales
  - C. scheduling
  - D. None of the above

Answer: D

- 15. In mobile marketing, the full form of LBS is \_\_\_\_\_\_
  - A. Location-based service
  - B. List-based service
  - C. Lead-based service
  - D. None of the above

Answer: A Location-based service







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## **DEPARTMENT OF MCA - ACADEMIC YEAR 23-24** MARK LIST OF ADD-ON PROGRAM "IMPORTANCE OF DIGITAL MARKETING AND E-COMMERCE" 06<sup>th</sup> - 17<sup>th</sup> Nov 2023

NO.	NAME	MARK
1	ABHISHEK C V	14
2	ABIN P S	14 .
3	ABIN R NAIR	13
4	ADHRIJA T S	. 13
5	AISWARYA G	14
6	AJMAL V M	14
7	ALTHAF N	13
8	AMANYURAG S	. 12
9	A M MOHAMMED FARHAN	14
10	ANJANA V S	13
11	ANJIMA A M	13
12	ANJU R	12
13	ANOOP KRISHNAN P	12
14	ANUPAMA N	13
15	ANURAG N K	. 12
16	APARNA DAS S	12
17	ARIFA O K	12
18	ARJUN C	14
19	ARUN SURESH	13
20	ASHISH T A	13
21	ASHLIN JAMES	12
22	ASNA A T	12
23	ASWANI M P	12
24	ASWIN SHIBU	12 NOINEERING
25	BHARATH B	
26	BHAVANA K N	14 M.G.A
27	DEEPAK D	14 2

28	HIDAYATHUL MUFEEDA S	14
29	IFRA NASRIN A	13
30	JISHNU S	14
31	K AKASH	12
32	KARTHIKA K S	12
33	MALAVIKA M	14
34	MANEESHA C M	. 13
35	MOHAMMED ANAS P	14
36	MOHAMMED SADHIK M S	13
37	MRIDULA M	14
38	NANDANA C	14
39	NASRIN M	12
40	NIHANA SIDHIK	12
41	NIMYA S	13
42	PRANAV SUNNY	14
43	RAMSEENA CP	12
44	REVATHI K R	. 13
45	R H ADITHYA MOL	13
46	SAFLA M	13
47	SAJLA PK	12
48	SANDRA P G	12
49	SANJAY A B	13
50	SARANATH U	12
51	SHABINA V	13
52	SHAFEENA K I	14
53	SHYAMSANKAR T	13
54	SOBHITHA S P	. 14
55	SREEDHANYA T S	13
56	SREEMA R	13
57	SUJINA E S	
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59	VISMAYA S	/8/
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# CERTIFICATE OF PARTICIPATION

THIS IS TO CERTIFY THAT

ABIN	Ps	of
		llege has actively participated

in a value added program "Importance of Digital Marketing and E-Commerce". Upon completion of theoretical and practical modules and successfully completed the assessment test this document of participation is presented.

Course Co-ordinator



**HOD-MCA** Department