Dept - Computer
Class - BE
Sem - II

Contents:

- **Machine Learning**
- **Information & Cyber Security**
- **Elective-III(Compilers)**
- **Elective-IV(Cloud Computing)**

Time Table
Department Of Computer Engineering
B.E. (Even Semester)
Session : 2018-19

Day's	09:30 to 10:30	10:30 to 11:30	11.30 - 12.30	01.15 - 02.15	02.15 - 03.15	03.15 - 04.15	04.15 - 05.15
MONDAY	Technical Activity - BigData & MongoDB		410252	410253	410251	B1-410254-SW1 B2-410255-PL B3-410254-SW2	
TUESDAY	Technical Activity - BigData & MongoDB		410250	410252	410253	B1-410254-SW1 B2-410255-PL B3-410254-SW2	
WEDNESDAY	LECTURE SERIES	B1-410255-PL B2-410254-SW1 B3-410255-LINUX		410257		TPC ACTIVITY	
THURSDAY	LECTURE SERIES	410250	410251	410252	410253	B1-410255-PL B2-410254-SW1 B3-410255-LINUX	
FRIDAY	410250	GATE TRAINING / 410256		GATE TRAINING / 410256		GATE TRAINING / 410256	
SATURDAY	TECHNICAL ACTIVITY - Python		410251	410251	MENTORING	LIBRARY	

Ms.Prachi S.Tambe	410250	Machine Learning
Mr.Narayan B.Vikhe	410251	Information and Cyber Security
Mr. Devidas S. Thosar	410252(B)	Elective III(Compilers)
Mr. Chetan G. Puri	410253(C)	Elective IV(Cloud Computing)
Ms. Prachi S. Tambe(B1,B2) Mr. Narayan.B. Vikhe(B3)	410254	Laboratory Practice III
Mr. Devidas S. Thosar(B1,B2) Mr.Chetan G.Puri(B3)	410255	Laboratory Practice IV
Mr.Kishor N.Shedge Mr.Devidas S.Thosar Ms.Prachi S.Tambe Mr.Uttam R.Patole	410256	Project Work Stage II
Ms. Prachi S. Tambe	410257	Audit Course 6

Subject – 1
Machine Learning (410250)

B. E. (Even Semester), Session 2018-2019
Scheme, Syllabus and Evaluation Guidelines, Of "Machine Learning (410250)"

Course Code	Course Name	Lectures Assigned			
		Theory	Practical	Tutorial	Total
410250	Machine Learning	3	4	-	7

Course Code	Course Name	Examination Evaluation Scheme											
		Theory										Practical	
		Internal Assessment											
								Ext					
410250	Machine Learning	20	20	20	20	5	5	30	70	100	25	50	175

Machine Learning
Course Contents

Unit -1 : Introduction to Machine learning   **08 Hours**

Classic and adaptive machines, Machine learning matters, Beyond machine learning-deep learning and bio inspired adaptive systems, Machine learning and Big data.
Important Elements of Machine Learning- Data formats, Learnability, Statistical learning approaches, Elements of information theory.

Unit – 2: Feature Selection   **08 Hours**

Scikit- learn Dataset, Creating training and test sets, managing categorical data, Managing missing features, Data scaling and normalization, Feature selection and Filtering, Principle Component Analysis(PCA)-non negative matrix factorization, Sparse PCA, Kernel PCA. Atom Extraction and Dictionary Learning.

Unit – 3 : Regression   **08 Hours**

Linear regression- Linear models, A bi-dimensional example, Linear Regression and higher dimensionality, Ridge, Lasso and ElasticNet, Robust regression with random sample consensus,Polynomial regression, Isotonic regression, Logistic regression-Linear classification, Logistic regression, Implementation and Optimizations, Stochastic gradient descendent algorithms, Finding the optimal hyper-parameters through grid search, Classification metric, ROC Curve.

Unit -4 : Naïve Bayes and Support Vector Machine   **08 Hours**

Bayes" Theorom, Naïve Bayes" Classifiers, Naïve Bayes in Scikit- learn- Bernoulli Naïve Bayes, Multinomial Naïve Bayes, and Gaussian Naïve Bayes.
Support Vector Machine(SVM)- Linear Support Vector Machines, Scikit- learn implementation-Linear Classification, Kernel based classification, Non- linear Examples. Controlled Support Vector Machines, Support Vector Regression.

Unit – 5 : Decision Trees and Ensemble Learning   **08 Hours**

Decision Trees- Impurity measures, Feature Importance. Decision Tree Classification with Scikit-learn, Ensemble Learning-Random Forest, AdaBoost, Gradient Tree Boosting, Voting Classifier.
Clustering Fundamentals- Basics, K-means: Finding optimal number of clusters, DBSCAN, Spectral Clustering. Evaluation methods based on Ground Truth- Homogeneity, Completeness, Adjusted Rand Index.
Introduction to Meta Classifier: Concepts of Weak and eager learner, Ensemble methods, Bagging, Boosting, Random Forests.

Unit – 6: Clustering Techniques   **08 Hours**

Hierarchical Clustering, Expectation maximization clustering, Agglomerative Clustering-Dendrograms, Agglomerative clustering in Scikit- learn, Connectivity Constraints.
Introduction to Recommendation Systems- Naïve User based systems, Content based Systems, Model free collaborative filtering-singular value decomposition, alternating least squares.
Fundamentals of Deep Networks-Defining Deep learning, common architectural principles of deep networks, building blocks of deep networks.

Books:

Text:

1. Giuseppe Bonaccorso, "Machine Learning Algorithms", Packt Publishing Limited, ISBN-10: 1785889621, ISBN-13: 978-1785889622
2. Josh Patterson, Adam Gibson, "Deep Learning: A Practitioners Approach", O"REILLY, SPD, ISBN: 978-93-5213-604-9, 2017 Edition 1 st .

References:

1. Ethem Alpaydin, " Introduction to Machine Learning", PHI 2nd Edition-2013, ISBN 978-0 262-01243-0
2. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", Cambridge University Press, Edition 2012, ISBN-10: 1107422221; ISBN-13: 978-1107422223
3. Tom Mitchell "Machine Learning" McGraw Hill Publication, ISBN : 00704280779780070428072
4. Nikhil Buduma, "Fundamentals of Deep Learning", O"REILLY publication, second edition 2017, ISBN: 1491925612

Evaluation Guidelines:

Internal Assessment (IA) : [CT (20Marks)+TA/AT(10 Marks)]

Class Test (CT) [20 marks]:- Three class tests, 20 marks each, will be conducted in a semester and out of these three, the average of best two will be selected for calculation of class test marks. Format of question paper is same as university.

TA [5 marks]: Three/four assignments will be conducted in the semester. Teacher assessment will be calculated on the basis of performance in assignments, class test and pre-university test

Attendance (AT) [5 marks]: Attendance marks will be given as per university policy.

Paper pattern and marks distribution for Class tests:

1. Question Paper will have 5 questions. Question 1 is objective question contain 5 sub questions each carry 1 marks.
2. Attempt any 3 questions from remaining 4 question each carry 5 marks.

In semester Exam :
30 Marks in semester exam : As per university guidelines.

Pre-University Test [50 Marks]
Paper pattern and marks distribution for PUT: Same as End semester exam

End Semester Examination [70 Marks]:
Paper pattern and marks distribution for End Semester Exam: As per university guidelines.

Lecture Plan
Machine Learning

1	**Introduction to Machine learning** Classic and adaptive machines
2	Machine learning matters
3	Beyond machine learning-deep learning and bio inspired adaptive systems
4	Machine learning and Big data.
5	Important Elements of Machine Learning- Data formats
6	Learnability
7	Statistical learning approaches
8	Elements of information theory
9	**Feature Selection** Scikit- learn Dataset
10	Creating training and test sets,managing categorical data
11	Managing missing feature
12	Data scaling and normalization
13	Feature selection and Filtering
14	Principle Component Analysis(PCA)-non negative matrix factorization,
15	Sparse PCA, Kernel PCA
16	Atom Extraction and Dictionary Learning
17	**Regression** Linear regression- Linear models, A bi-dimensional example
18	Linear Regression and higher dimensionality
19	Ridge, Lasso and ElasticNet
20	Robust regression with random sample consensus, Polynomial regression, Isotonic regression,
21	Logistic regression-Linear classification, Logistic regression
22	Implementation and Optimizations
23	Stochastic gradient descendent algorithms
24	Finding the optimal hyper-parameters through grid search, Classification metric, ROC Curve
25	**Naïve Bayes and Support Vector Machine** Bayes‟ Theorom, Naïve Bayes‟ Classifiers
26	Naïve Bayes in Scikit- learn- Bernoulli Naïve Bayes
27	Multinomial Naïve Bayes,and Gaussian Naïve Bayes.
28	Support Vector Machine(SVM)- Linear Support Vector Machines
29	Scikit- learn implementation- Linear Classification
30	Kernel based classification,Non- linear Examples
31	Controlled Support Vector Machines
32	Support Vector Regression.
33	**Decision Trees and Ensemble Learning** Decision Trees- Impurity measures, Feature Importance
34	Decision Tree Classification with Scikit learn
35	Ensemble Learning-Random Forest
36	AdaBoost, Gradient Tree Boosting, Voting Classifier
37	Clustering Fundamentals- Basics, K-means: Finding optimal number of clusters
38	DBSCAN,Spectral Clustering. Evaluation methods based on Ground Truth-Homogeneity
39	Completeness,Adjusted Rand Index.
40	Introduction to Meta Classifier: Concepts of Weak and eager learner, Ensemble methods,

	Bagging, Boosting, Random Forests.
41	**Clustering Techniques** Hierarchical Clustering, Expectation maximization clustering
42	Agglomerative Clustering- Dendrograms
43	Agglomerative clustering in Scikit- learn, Connectivity Constraints
44	Introduction to Recommendation Systems- Naïve User based systems, Content based Systems
45	Model free collaborative filtering-singular value decomposition, alternating least squares.
46	Fundamentals of Deep Networks-Defining Deep learning
47	common architectural principles of deep networks
48	building blocks of deep networks

Course Delivery, Objectives, Outcomes
Machine Learning
Semester – 8

Course Delivery :

The course will be delivered through lectures, assignment/tutorial sessions, class room interaction, and presentations.

Course Objectives:

1. To understand human learning aspects and relate it with machine learning concepts.
2. To understand nature of the problem and apply machine learning algorithm.
3. To find optimized solution for given problem.

Course Outcomes:

On completion of the course, student will be able to–

1. Distinguish different learning based applications
2. Apply different pre-processing methods to prepare training data set for machine learning.
3. Design and implement supervised and unsupervised machine learning algorithm.
4. Implement different learning models
5. Learn Meta classifiers and deep learning concepts

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1			1		2	1					
CO2	2	1		1		1						1
CO3	1	2		2								
CO4		1								2		
CO5							2					1

Justification Of CO-PO Mapping

CO1 with PO1	According to CO1 students learn usage of various structures in approaching the problem solution. So it is moderately correlated to PO1.

CO1 with PO4	According to CO1 students learn usage of various structures in approaching the problem solution. So it is slightly correlated to PO4.
CO1 with PO6	According to CO1 students learn usage of various structures in approaching the problem solution. So it is correlated to PO6.
CO1 with PO7	According to CO1 students learn usage of various structures in approaching the problem solution. So it is slightly correlated to PO7.
CO2 with PO1	According to CO2 students get the knowledge of design algorithms to solve the programming problems. So it is moderately correlated to PO1.
CO2 with PO2	According to CO2 students get the knowledge of design algorithms to solve the programming problems. So it is slightly related to PO2
CO2 with PO4	According to CO2 students get the knowledge of design algorithms to solve the programming problems. So it is slightly related to PO4
CO2 with P12	According to CO2 students get the knowledge of design algorithms to solve the programming problems. So it is slightly related to PO12.
CO3 with PO1	According to CO3 Students are able to use effective and efficient data structures in solving various domain problems. So it is slightly corelated with PO1.
CO3 with PO2	According to CO3 Students are able to use effective and efficient data structures in solving various domain problems. So it is moderately corelated with PO2.
CO3 with PO4	According to CO3 Students are able to use effective and efficient data structures in solving various domain problems. So it is slightly corelated with PO4.
CO4 with PO2	According to CO4 Students learn how to apply suitable algorithm and data structure to analyze the problems. So it is slightly corelated with PO2.
CO4 with PO10	According to CO4 Students learn how to apply suitable algorithm and data structure to analyze the problems. So it is moderately corelated with PO10.
CO5 with PO7	According to CO5 Students learn how to use appropriate algorithmic strategy for better efficiency. So it is moderately corelated with PO7.
CO5 with PO12	According to CO5 Students learn how to use appropriate algorithmic strategy for better efficiency. So it is slightly corelated with PO12.

Assignment 1

Q.1: What is Machine learning? What is the need of it?
Q.2: Explain four examples of machine learning in detail?
Q.3: Explain and differentiate predictive and descriptive learning task.
Q.4: Explain geometric models in detail with example.
Q.5: What is supervised and unsupervised learning? Explain with the examples

Assignment 2

Q.1: What are the different types of features?
Q.2: Explain Filter feature selection method.
Q.3:What is training data set and rest data set ?
Q.4:Write a short note on Sparse PCA, Kernel PCA.
Q.5:What do u mean by Principle Component Analysis(PCA).Expalain non negative matrix factorization method.

Assignment 3

Q.1: Explain statistical and geometric properties of linear Regression.?
Q.2: Explain

       (i) Shrinkage Mention
       (ii) Ridge Regression
       (iii)Lasso Regression

Q.3:Write a short note on Polynomial regression & Isotonic regression.
Q.4:Short note on linear models.
Q.5:Write a short note on Stochastic gradient descendent algorithms.

Assignment 4

Q.1:What do you meant by support vectors and support vector machine ?
Q.2:Explain following types of kernel methods
   (i)Polynomial kernels
   (ii)Gaussian kernels
Q.3:Write perceptron learning algorithm with polynomial kernels.
Q.4:What is Naive Bayes algorithm? How Naive Bayes Algorithms works?
Q.5:Explain Naïve Bayes in Scikit- learn- Bernoulli Naïve Bayes.

Assignment 5

Q.1: Explain Ensemble method?
Q.2: State difference between Bagging and Boosting?
Q.3:Explain Decision Tree Classification with Scikit-learn.

Q.4:Write a short note on AdaBoost, Gradient Tree Boosting, Voting Classifier.
Q.5:Explain k-means algorithm.

Assignment 6

Q.1:What are different clustering techniques?
Q.2:Explain building blocks of deep networks.
Q.3:Explain Naïve User based systems.
Q.4:Write a short note on Agglomerative Clustering- Dendrograms, Agglomerative clustering in Scikit- learn.
Q.5:Explain Deep learning approach for recommendations

Question Bank

Unit -I

Q.1: What is Machine learning? What is the need of it?

Q.2: Explain four examples of machine learning in detail?

Q.3: Explain structure of machine learning?

Q.4: Explain learning Vs Designing?

Q.5: Consider the problem of sorting 'n' numbers. Is it wise to apply machine learning to solve this problem? justify.

Q.6: Explain Training verses Testing.

Q.7: Explain Bias variance trade off.

Q.8: Explain and differentiate predictive and descriptive learning task.

Q.9: Explain geometric models in detail with example.

Q.10. Explain logical models in detail with example.

Q.11. Explain Probabilistic models in detail with example.

Q.12: Explain characteristic of machine models.

Q.13: What are the advantages of machine learning?

Q.14: What is supervised and unsupervised learning? Explain with the examples

Q.15: What are the components of machine learning? Or explain in detail structure of learning.

Q.16: Explain role of geometric properties in geometric models.

Q.17: Explain role of Probabilistic properties in Probabilistic models.

Q.18: Consider any machine learning task. Explain it in the context of structure of learning.

Q.19: What do you meant by linear transformations in Geometric models.

Q.20: Explain key role of feature selection in deep learning.

Q.21:Explain what is deep learning? What are characteristics of deep learning?

Q.22:What is Reinforcement learning? Explain in details.

Unit-II

Q.1: What do you meant by features? What are the different properties of features?

Q.2: What are the different types of features?

Q.3: What do you meant by feature transformation and feature construction?.

Q.4: Explain feature selection in details.

Q.5: Explain impact of features on machine learning.

Q.6: Explain hierarchy of feature constructions.

Q.7: What do you meant by feature calibration? What are the advantages of it?

Q.8: Explain
(i)   Thresholding
(ii)   Discretization
(iii)   Ordering
(iv)   Unordering
(v)   Binarization

Q.9: Explain wrapper method.

Q.10: Explain Filter feature selection method.

Q.11: What is training data set and rest data set ?

Q.12: Write a short note on Sparse PCA, Kernel PCA.

Q.13: What do u mean by Principle Component Analysis(PCA).Expalain non negative matrix factorization method.

Unit-III

Q.1: What do you meant by Regression ? explain with example.

Q.2: What is simple linear Regression or linear Regression?

Q.3: What is multiple linear Regression?

Q.4: Explain statistical and geometric properties of linear Regression.?

Q.5: Write and explain characteristic of best Regression line.

Q.6: If Errors follow normal distribution with mean O and variance s^2 then show that output variable Y also follows normal distribution.

Q.7: Explain

       (i) Shrinkage Mention

       (ii) Ridge Regression

       (iii)Lasso Regression

Q.8: Write a short note on Polynomial regression & Isotonic regression.

Q.9: Short note on linear models.

Q.10: What do you meant by least square method ? Explain least square method in the context of linear regression.

Q.11: Write a short note on Stochastic gradient descendent algorithms.

Unit-IV

Q.1: What do you meant by support vectors and support vector machine ?

Q. 2: Support vector machine is maximum margin classifier comment and Justify correctness or incorrectness of the statement.

Q.3: Short note on : Support vector machine.

Q. 4: Explain Geometry of support vector machine.

Q. 5: Explain mathematical formulation of SVM objective function constraints for it.

Q.6: Derive the criteria to select misclassification of any instance X by SVM.

Q.7: Explain role of kernel methods to handle linearly non-separable data.

Q.8: What do you meant by kernel method ? What is need of kernel methods ?

Q.9: Explain following types of kernel methods

(i)Polynomial kernels

(ii)Gaussian kernels

Q.10:Explain with example relation ship between no of dimensions of feature space and input space.

Q.11:Write perceptron learning algorithm with polynomial kernels.

Q.12:With example illustrate, polynomial kernels.

Q.13:What are characteristics of kernel methods ?

Q.14:Explain procedure for obtaining class probabilities from linear classification

Q.15:Explain process of logistic calibration.

Q.16:What is Isotonic calibration process or Isotonic calibration process constructs linear piecewise calibration function illustrate.

Q.17:Logistic calibration process constructs sigmoid function Illustrate.

Q.18:Explain kernel methods which are suitable for perceptions.

Q.19:Explain kernel methods which are suitable for SVM ?

Q.20:What is Naive Bayes algorithm?

Q.21:How Naive Bayes Algorithms works?

Q.22:What are the Pros and Cons of using Naive Bayes? 4 Applications of Naive Bayes Algorithm.

Q.23:Expalain Steps to build a basic Naive Bayes Model in Python.

Q.24:Explain Naïve Bayes in Scikit- learn- Bernoulli Naïve Bayes.

Unit-V

Q.1: Explain Ensemble method?

Q.2: What do you mean by Bagging?

Q.3: Explain how performance of learning models can be increased in Bagging?

Q.4: Explain Bagging with respect to Classification?

Q.5: Explain Bagging with respect to regression?

Q.6: Explain Ensemble classifier which considers complementing classifier purposefully ? (Hint Boosting).

Q.7: State difference between Bagging and Boosting?

Q.8:Explain Decision Tree Classification with Scikit-learn.

Q.9:Write a short note on AdaBoost, Gradient Tree Boosting, Voting Classifier.

Q.10:Explain k-means algorithm.

Unit-VI

Q.1:What are different clustering techniques?

Q.2:-Define Deep learning.

Q.3:Explain common architectural principles of deep networks.

Q.4:Explain building blocks of deep networks.

Q.5:What is meant by recommendation system?

Q.6:What is personalized recommendation?What is content based recommendation?

Q.7:Explain Naïve User based systems.

Q.8:Write a short note on Agglomerative Clustering- Dendrograms, Agglomerative clustering in

Scikit- learn.

Q.9:Explain Model free collaborative filtering-singular value decomposition system.

Q.10:Explain Deep learning approach for recommendations

University Question papers

Subject – 2

Information and Cyber Security
410251

B. E. (Even Semester), Session 2018-2019
Scheme, Syllabus and Evaluation Guidelines, of "Information and Cyber Security 410251"

Course Code	Course Name	Lectures Assigned			
		Theory	Practical	Tutorial	Total
410251	Information and Cyber Security	3	-	-	3

Course Code	Course Name	Examination Evaluation Scheme									
		Theory							Practical		
		Internal Assessment					Ext				
410251	Information and Cyber Security	20	20	20	20	30	70	100	25	50	175

Information and Cyber Security
Course Contents

Unit -1 : Security Basics   **08 Hours**

Introduction, Elements of Information Security, Security Policy, Techniques, Steps, Categories, Operational Model of Network Security, Basic Terminologies in Network Security. Threats and Vulnerability, Difference between Security and Privacy.

Unit – 2: Data Encryption Techniques And Standards   **08 Hours**

Introduction, Encryption Methods: Symmetric, Asymmetric, Cryptography, Substitution Ciphers. Transposition Ciphers, Stenography applications and limitations, Block Ciphers and methods of operations, Feistal Cipher, Data Encryption Standard (DES), Triple DES, DES Design Criteria, Weak Keys in DES Algorithms, Advance Encryption Standard (AES).

Unit – 3 : Public Key And Management   **08 Hours**

Public Key Cryptography, RSA Algorithm: Working, Key length, Security, Key Distribution, Deffie-Hellman Key Exchange, Elliptic Curve: Arithmetic, Cryptography, Security, Authentication methods, Message Digest, Kerberos, X.509 Authentication service. Digital Signatures: Implementation, Algorithms, Standards (DSS), Authentication Protocol

Unit -4 : Security Requirements   **08 Hours**

IP Security: Introduction, Architecture, IPV6, IPv4, IPSec protocols, and Operations, AH Protocol, ESP Protocol, ISAKMP Protocol, Oakkey determination Protocol, VPN. WEB Security: Introduction, Secure Socket Layer (SSL), SSL Session and Connection, SSL Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol. Electronic Mail Security: Introduction, Pretty Good Privacy, MIME, S/MIME, Comparison. Secure Electronic Transaction.

Unit – 5 : Firewall And Intrusion   **08 Hours**

Introduction, Computer Intrusions. Firewall Introduction, Characteristics and types, Benefits and limitations. Firewall architecture, Trusted Systems, Access Control. Intrusion detection, IDS: Need, Methods, Types of IDS, Password Management, Limitations and Challenges.

Unit – 6: Confidentiality And Cyber Forensic   **08 Hours**

Introduction to Personally Identifiable Information (PII), Cyber Stalking, PII impact levels with examples Cyber Stalking, Cybercrime, PII Confidentiality Safeguards, Information Protection Law: Indian Perspective.

Books:

Text:

1. Bernard Menezes, "Network Security and Cryptography", Cengage Learning India, 2014
2. Nina Godbole, Sunit Belapure, "Cyber Security", Wiley India, 2014

References:

1. Eoghan Casey, "Digital Evidence and Computer Crime Forensic Science, Computers and the Internet", ELSEVIER, 2011
2. Atul Kahate, "Cryptography and Network Security", Mc Graw Hill Publication, 2nd Edition, 2008
3. William Stallings, "Cryptography and network security principles and practices", Pearson, 6th Edition
4. Forouzan, "Cryptography and Network Security (SIE)", Mc Graw Hill
5. Dr. Nilakshi Jain-Digital Forensic: The Fascinating World of Digital Evidences-Wiley India

Evaluation Guidelines:

Internal Assessment (IA) : [CT (20Marks)+TA/AT(10 Marks)]

Class Test (CT) [20 marks]:- Three class tests, 20 marks each, will be conducted in a semester and out of these three, the average of best two will be selected for calculation of class test marks. Format of question paper is same as university.

TA [5 marks]: Three/four assignments will be conducted in the semester. Teacher assessment will be calculated on the basis of performance in assignments, class test and pre-university test

Attendance (AT) [5 marks]: Attendance marks will be given as per university policy.

Paper pattern and marks distribution for Class tests:

1. Question paper will comprise of 3 Section A, B and C with internal choice of questions.
2. Section A contains 5 short answer type questions of 1 mark each. All questions are compulsory. (Total 5 Marks)
3. Section B contains 4 medium answer type questions of 2.5 marks each. All questions are compulsory. (Total 10 marks)
4. Section C contains 1 long answer type questions of 5 marks. (Total 5 marks)

In Semester Examination [30 Marks]
Paper pattern and marks distribution for PUT: Same as End semester exam

End Semester Examination [70 Marks]:
Paper pattern and marks distribution for End Semester Exam: As per university guidelines.

Lecture Plan
Information and Cyber Security

1	**UNIT –I** Introduction, Elements of Information Security
2	Security Policy, Security Techniques
3	Security Steps, Security Categories
4	Operational Model of Network Security
5	Operational Model of Network Security
6	Basic Terminologies in Network Security
7	Threats and Vulnerability
8	Difference between Security and Privacy
9	**UNIT –II** Introduction, Encryption Methods, Symmetric, Asymmetric
10	Cryptography, Substitution Ciphers, Transposition Ciphers
11	Stenography applications and limitations
12	Block Ciphers and methods of operations,
13	Feistal Cipher, Data Encryption Standard (DES)
14	Triple DES, DES Design Criteria
15	Weak Keys in DES Algorithms
16	Advance Encryption Standard (AES).
17	**UNIT –III** Public Key Cryptography, RSA Algorithm
18	Working, Key length, Security, Key Distribution
19	Deffie-Hellman Key Exchange
20	Elliptic Curve: Arithmetic, Cryptography Security
21	Authentication methods
22	Message Digest, Kerberos , X.509 Authentication service
23	Digital Signatures: Implementation, Algorithms
24	Standards, Authentication Protocol
25	**UNIT –IV** IP Security: Introduction, Architecture, IPV6, IPv4
26	IPSec protocols ,Operations, AH Protocol, ESP Protocol, ISAKMP Protocol
27	Oakkey determination Protocol, VPN. WEB Security
28	Introduction, Secure Socket Layer (SSL), SSL Session and Connection
29	SSL Record Protocol, Change Cipher Spec Protocol, Alert Protocol
30	Handshake Protocol. Electronic Mail Security: Introduction
31	Pretty Good Privacy, MIME, S/MIME, Comparison.
32	Secure Electronic Transaction (SET).
33	**UNIT –V** Introduction, Computer Intrusions.
34	Firewall Introduction
35	Characteristics and types, Benefits and limitations.
36	Firewall architecture, Trusted Systems
37	Access Control. Intrusion detection
38	IDS: Need, Methods, Types of IDS
39	Password Management
40	Limitations and Challenges.
41	**UNIT –VI** Introduction to Personally Identifiable Information (PII),.
42	Cyber Stalking,
43	PII impact levels with examples Cyber Stalking
44	PII impact levels with examples Cyber Stalking
45	Cybercrime
46	Cybercrime
47	PII Confidentiality Safeguards,
48	Information Protection Law: Indian Perspective

Course Delivery, Objectives, Outcomes
Information and Cyber Security
Semester – 8

Course Delivery:

The course will be delivered through lectures, assignment/tutorial sessions, class room interaction, and presentations.

Course Objectives:

1. To offer an understanding of principle concepts, central topics and basic approaches in information and cyber security.
2. To know the basics of cryptography.
3. To acquire knowledge of standard algorithms and protocols employed to provide confidentiality, integrity and authenticity.
4. To enhance awareness about Personally Identifiable Information (PII), Information Management, cyber forensics.

Course Outcomes:

On completion of the course, student will be able to–

1. Gauge the security protections and limitations provided by today's technology.
2. Identify information security and cyber security threats.
3. Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
4. Build appropriate security solutions against cyber-attacks.

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2			2									
CO3		1										
CO4				2								

Justification Of CO-PO Mapping

JUSTIFICATION OF CO-PO MATCHING	
CO1 WITH PO1	According to CO1 students Gauge the security protections and limitations provided by today's technology. So it is slightly correlated to PO1.
CO2 WITH PO2	According to CO2 students Identify information security and cyber security threats. So it is moderately correlated to PO2.
CO3 WITH PO3	According to CO3 Analyze threats in order to protect or defend it in cyberspace from cyber-attacks. So it is moderately correlated to PO3.
CO4 WITH PO4	According to CO4 students Build appropriate security solutions against cyber-attacks. So it is slightly correlated to PO4.

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Assignment 1
Information and Cyber Security 410251

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UNIT 1:

1. 1. Explain Elements of Information Security
2. 2.Explain Different Security Policy
3. Explain Different Techniques of Information Security
4. Explain Operational Model of Network Security
5. Explain Basic Terminologies in Network Security.

3.   **Assignment 2**

UNIT 2:

1. Explain Different Encryption Methods in details

2. Explain Stenography applications and limitations

3. Explain Block Ciphers and methods of operations

4. Explain Transposition Ciphers in details

5. Explain Data Encryption Standard Algorithm (DES)

<div align="center">

Assignment 3

</div>

UNIT 3:

1. Explain RSA Algorithm

2. Explain Deffie-Hellman Key Exchange

3. Explain Digital Signatures and Implementation

4. Explain Digital Signatures Standards (DSS)

5. Explain Authentication Protocol

<div align="center">

Assignment 4

</div>

UNIT 4:

1. Describe IPsec protocol with its components and security services.
2. What is secure Electronic Transaction?
3. Explain Secure Socket Layer handshake protocol in brief.
4. Explain ISAKMP protocol for IP sec.
5. Explain secure socket layer handshake protocol in brief.

<div align="center">

Assignment 5

</div>

UNIT 5:

1. What are the various characteristics of firewall.
2. Explain Architecture of firewall.
3. Explain Anomaly-based Intrusion Detection System.
4. List and explain any two password management practices.
5. What are the various characteristics of firewall?

<div align="center">

Assignment 6

</div>

UNIT 6:

1. What is hacking? Explain mobile hacking.

2. What is USB U3 hacking.
3. What is input validation attack.
4. How VoIP hacking is done by attackers? What are the counter measures for it?
5. What is hacking? Explain mobile hacking.

QUESTION BANK

Information and Cyber Security 410251

UNIT 1:

1. Explain Elements of Information Security
2. Explain Different Security Policy
3. Explain Different Techniques of Information Security
4. Explain Operational Model of Network Security
5. Explain Basic Terminologies in Network Security
6. Explain Threats and Vulnerability in details
7. Difference between Security and Privacy

UNIT 2:

1. Explain Different Encryption Methods in details

2. Explain Stenography applications and limitations

3. Explain Block Ciphers and methods of operations

4. Explain Transposition Ciphers in details

5. Explain Data Encryption Standard Algorithm (DES)

6. Explain DES Design Criteria

7. Explain Advance Encryption Standard (AES).

UNIT 3:

1. Explain Public Key Cryptography

2. Explain RSA Algorithm

3. Explain Deffie-Hellman Key Exchange

4. Explain Elliptic Curve in details

5. Explain Digital Signatures and Implementation

6. Explain Digital Signatures Standards (DSS)

7. Explain Authentication Protocol

UNIT 4:

1. What is Backdoors and Key Escrow in PGP?
2. Describe IPsec protocol with its components and security services.
3. Explain OAKLEY key determination protocol.
4. What is secure Electronic Transaction?
5. Explain Secure Socket Layer handshake protocol in brief.
6. Explain working of PGP in detail.
7. Describe IPsec protocol with its components & security services.
8. Explain ISAKMP protocol for IP sec.
9. What is VPN? Explain types of VPN.
10. Explain secure socket layer handshake protocol in brief.

UNIT 5:

1. What are the challenges of intrusion detection?
2. List and explain any two password management practices.
3. What are the various characteristics of firewall.
4. Explain Architecture of firewall.
5. Explain Anomaly-based Intrusion Detection System.
6. What is Trusted System?
7. Explain types of Intrusion detection systems (IDS).
8. List and explain any two password management practices.
9. What are the various characteristics of firewall?
10. Describe types of firewall in detail.

UNIT 6:

1. What is SIP scanning in VoIP attack? State its counter measure
2. Identifying wireless network defenses and countermeasures.
3. What is hacking? Explain mobile hacking.
4. What is USB U3 hacking.
5. What is input validation attack.
6. How VoIP hacking is done by attackers? What are the counter measures for it?
7. Identifying wireless network defenses & counter measures.
8. What is hacking? Explain mobile hacking.

University Question Papers

Subject – 3

410252(B): Compilers

B. E. (Even Semester), Session 2018-2019
Scheme, Syllabus and Evaluation Guidelines, Of "Compilers (410252(B))"

Course Code	Course Name	Lectures Assigned			
		Theory	Practical	Tutorial	Total
410252(B)	Compilers	3	-	-	3

Course Code	Course Name	Examination Evaluation Scheme									
		Theory							Practical		
		Internal Assessment					Ext				
410252(B)	Compilers	20	20	20	20	30	70	100	0	0	0

Compilers (410252(B))
Fourth Year of Computer Engineering (2015 Course)

Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week	03	In-Sem (Paper): 30 Marks
		End-Sem (Paper): 70 Marks

Prerequisite Courses: Theory of Computation(310241), 310251-Systems Programming and Operating System
Companion Course: 410255-Laboratory Practice IV

Course Objectives:
 To introduce process of compilation
 To introduce complier writing tools
 To address issues in code generation and optimization

Course Outcomes:
On completion of the course, student will be able to–
 Design and implement a lexical analyzer and a syntax analyzer
 Specify appropriate translations to generate intermediate code for the given programming language construct
 Compare and contrast different storage management schemes
 Identify sources for code optimization

Course Contents

Unit I
Notion and Concepts   08 Hours

Introduction to compilers Design issues, passes, phases, symbol table Preliminaries Memory management, Operating system support for compiler, Lexical Analysis Tokens, Regular Expressions, Process of Lexical analysis, Block Schematic, Automatic construction of lexical analyzer using LEX, LEX features and specification.

Unit II
Parsing   08 Hours

Syntax Analysis CFG, top-down and bottom-up parsers, RDP, Predictive parser, SLR, LR(1), LALR parsers, using ambiguous grammar, Error detection and recovery, automatic construction of parsers using YACC, Introduction to Semantic analysis, Need of semantic analysis, type checking and type conversion.

Unit III
Syntax Translation Schemes   08 Hours

Syntax Directed Translation - Attribute grammar, S and L attributed grammar, bottom up and top down evaluations of S and L attributed grammar, Syntax directed translation scheme, Intermediate code - need, types: Syntax Trees, DAG, Three-Address codes: Quadruples, Triples and Indirect Triples, Intermediate code generation of declaration statement and assignment statement.

Unit IV
Run-time Storage Management   08 Hours

Storage Management – Static, Stack and Heap, Activation Record, static and control links, parameter passing, return value, passing array and variable number of arguments, Static and Dynamic scope, Dangling Pointers, translation of control structures – if, if-else statement, Switch-case, while, do -while statements, for, nested blocks, display mechanism, array assignment, pointers, function call and return. Translation of OO constructs: Class, members and Methods.

Unit V
Code Generation   08 Hours

Code Generation - Issues in code generation, basic blocks, flow graphs, DAG representation of basic blocks, Target machine description, peephole optimization, Register allocation and Assignment, Simple code generator, Code generation from labeled tree, Concept of code generator.

Unit VI
Code Optimization   08 Hours

Need for Optimization, local, global and loop optimization, Optimizing transformations, compile time evaluation, common sub-expression elimination, variable propagation, code movement, strength reduction, dead code elimination, DAG based local optimization, Introduction to global data flow analysis, Data flow equations and iterative data flow analysis.

Books:
Text:
1. V Aho, R Sethi, J D Ullman, "Compilers: Principles, Techniques, and Tools", Pearson Edition, ISBN 81-7758-590-8
2. Dick Grune, Bal, Jacobs, Langendoen, " Modern Compiler Design", Wiley, ISBN 81-265-0418-8

References:

1. Anthony J. Dos Reis, "Compiler Construction Using Java", JavaCC and Yacc Wiley, ISBN 978-0-470-94959-7
2. K Muneeswaran, "Compiler Design", Oxford University press, ISBN 0-19-806664-3
3. J R Levin, T Mason, D Brown, "Lex and Yacc", O'Reilly, 2000 ISBN 81-7366-061-X

Evaluation Guidelines:

Internal Assessment (IA) : [CT (20Marks)+TA/AT(10 Marks)]

Class Test (CT) [20 marks]:- Two class tests, 20 marks each, will be conducted in a semester and the average of two will be selected for calculation of class test marks. Format of question paper is same as university.

TA [5 marks]: Five/Six assignments will be conducted in the semester.Teacher assessment will be calculated on the basis of performance in assignments, class test and pre-university test

Attendance (AT) [5 marks]: Attendance marks will be given as per university policy.

Paper pattern and marks distribution for Class tests:

1. Question paper will comprise of 3 Section A, B and C with internal choice of questions.
2. Section A contains 5 short answer type questions of 1 mark each. All questions are compulsory. (Total 5 Marks)
3. Section B contains 4 medium answer type questions of 2.5 marks each. All questions are compulsory. (Total 10 marks)
4. Section C contains 1 long answer type questions of 5 marks. (Total 5 marks)

In Semester Examination [30 Marks]
Paper pattern and marks distribution for PUT: Same as End semester exam

End Semester Examination [70 Marks]:
Paper pattern and marks distribution for End Semester Exam: As per university guidelines.

Lecture Plan
Compilers (410252(B))

Lecture No.	Name of Topic
1	**Unit-I: Notion and Concepts**
	Introduction to compilers Design issues.
2	Passes, Phases.
3	Symbol table Preliminaries Memory management.
4	Operating system support for compiler.
5	Lexical Analysis Tokens, Regular Expressions.
6	Process of Lexical analysis, Block Schematic.
7	Automatic construction of lexical analyzer using LEX.
8	LEX features and specification.
9	**Unit-II: Parsing**
	Syntax Analysis CFG, top-down and bottom-up parsers.
10	RDP, Predictive parser.
11	SLR, LR (1).
12	LALR parsers, using ambiguous grammar.
13	Error detection and recovery.
14	Automatic construction of parsers using YACC.
15	Introduction to Semantic analysis, Need of semantic analysis,
16	Type checking and type conversion.
17	**Unit-III: Syntax Translation Schemes**
	Syntax Directed Translation - Attribute grammar.
18	S and L attributed grammar.
19	Bottom up and top down evaluations of S and L attributed grammar.
20	Syntax directed translation scheme, Intermediate code – need.
21	Types: Syntax Trees, DAG.
22	Three-Address codes: Quadruples, Triples.
23	Indirect Triples, Intermediate code generation of declaration statement.
24	Intermediate code generation of assignment statement.
25	**Unit-IV: Run-time Storage Management.**
	Storage Management – Static, Stack and Heap.
26	Activation Record, static and control links.
27	Parameter passing, return value, passing array and variable number of arguments.
28	Static and Dynamic scope, Dangling Pointers,
29	translation of control structures – if, if-else statement,
30	Switch-case, while, do -while statements, for, nested blocks,
31	display mechanism, array assignment, pointers, function call and return.
32	Translation of OO constructs: Class, members and Methods.
33	**Unit-V: Code Generation**
	Code Generation - Issues in code generation.
34	Basic blocks, flow graphs.
35	DAG representation of basic blocks.

36	Target machine description, peephole optimization.
37	Register allocation and Assignment.
38	Simple code generator.
39	Code generation from labeled tree.
40	Concept of code generator.
41	**Unit-VI: Code Optimization** Need for Optimization, local, global and loop optimization,
42	Optimizing transformations.
43	Compile time evaluation, common sub-expression elimination.
44	Variable propagation, code movement.
45	Strength reduction
46	Dead code elimination, DAG based local optimization,
47	Introduction to global data flow analysis.
48	Data flow equations and iterative data flow analysis.

Course Delivery, Objectives, Outcomes
Compilers (410252(B))
Semester – 8

Course Delivery :

The course will be delivered through lectures, assignment/tutorial sessions, class room interaction, and presentations.

Course Objectives:

1. To introduce process of compilation.
2. To introduce Syntax Analysis & Error Detection.
3. To introduce Semantic Analysis & Intermediate Code generation Process.
4. To introduce Storage Management & translation of control structures
5. To introduce complier writing tools.
6. To address issues in code generation and optimization

Course Outcomes:

On completion of the course, student will be able to–

1. **CO1:** Design and implement a lexical analyzer and a syntax analyzer

2. CO2: Specify appropriate translations to generate intermediate code for the given Programming language construct

3. CO3: Compare and contrast different storage management schemes

4. **CO4:** Identify sources for code optimization & Target code Generation

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												

Justification Of CO-PO Mapping

JUSTIFICATION OF CO-PO MATCHING	
CO1 WITH PO1	According to CO1 students get basic knowledge of Compiler design. So it is slightly correlated to PO1.
CO2 WITH PO2	According to CO2 students get basic knowledge of

	translations to generate intermediate code So it is moderately correlated to PO2.
CO3 WITH PO3	According to CO3 students get knowledge of different storage management schemes. So it is moderately correlated to PO3.
CO4 WITH PO4	According to CO4 students get knowledge of sources for code optimization & Target code Generation. So it is slightly correlated to PO4.

ASSIGNMENTS

Compilers (410252(B))

Assignment 1
Unit-I: Notion and Concepts

Q1. Explain need of symbol table with compiler. List different data structures for symbol table.

Q.2 What is LEX? Give format of LEX specification file.

Q.3.What is LEX? How tokens are generated in LEX.

Q.4. Explain Static & Dynamic Storage allocation.

Q.5. Explain Phases of Compiler in detail.

Assignment 2
Unit-II: Parsing

Q.1. What are problems/ issues associated with top-down parser.

Q.2. Generate LR(1) parsing table for following grammar:

$S \rightarrow BB$, $B \rightarrow cB$, $B \rightarrow d$.

Q.3. Differentiate between syntax and semantic analysis by giving example.

Q.4. Check if following grammar is LL (1)

$S \rightarrow iCtSS'| a$, $S \rightarrow eS | €ïC \rightarrow b$.

Q.5. Calculate first and follow for the following grammar?

a) E-> E+T/T   T-> T*F/F   F-> (E)/id

b) S->xABC   A->a|bbD   B->a|ε   C->b| ε   D->c| ε

Assignment 3
Unit-III: Syntax Translation Schemes

Q1. Explain need for intermediate code & explain advantages of intermediate code.

Q.2. Explain the following terms

1) Synthesized Attributes   2) Inherited Attributes

3) Syntax Tree & DAG   4)Dependency graph

Q.3. Generate intermediate code for following statement:

a= b+c

(Specify syntax directed translation scheme)

Q.4. Define: L-attributed grammar in detail.

Q.5.Write syntax directed translation scheme for Boolean expressions.

Assignment 4

Unit-IV: Run-time Storage Management.

Q.1.What is Dangling Pointers? Explain its use in Compiler in detail.

Q.2. Write the definition of symbol table and procedure to store the names in symbol table.

Q.3. What are the data structures used in symbol table?

Q.4. What are the limitations of stack allocation?

Q.5.What is activation record? Write the various fields of Activation Record.

Assignment 5
Unit-V: Code Generation

Q.1. What is Register Allocation & Assignment Problem.

Q.2. Write Short Note on :

1) Peephole Optimization.   2) Applications of DAG in Code generation.
3) Flow graph (with example)   4) Dominators

Q.3. What is code optimization? Explain machine dependent and independent code optimization.

Q.4. What is common sub-expression and how to eliminate it? Explain with example.

Q.5. What is control and data flow analysis? Explain with example

Assignment 6
Unit-VI: Code Optimization

Q.1. Explain issues in Code Optimization.

Q.2. What are the patterns used for code optimization?

Q.3. What are the properties of optimizing compilers?

Q.4. What are the techniques used for loop optimization?

Q.5. Explain the structure of general activation record in detail.

QUESTION BANK

Compilers (410252(B))

Unit-I: Notion and Concepts
Q1. Explain need of symbol table with compiler. List different data structures for symbol table.

Q.2 What is LEX? Give format of LEX specification file.

Q.3 What are lexeme, pattern and token in lexical analysis?

Q.4.What is LEX? How tokens are generated in LEX.

Q.5.What is garbage collection?

Q.6. Explain Static & Dynamic Storage allocation.

Q.7. Explain Phases of Compiler in detail.

Unit-II: Parsing
Q.1. What are problems/ issues associated with top-down parser.

Q.2. What is type checking?

Q.3. Generate LR(1) parsing table for following grammar:
   S → BB , B→ cB , B→ d.

Q.4. Explain in brief: Recursive Descent parser.

Q.5. Differentiate between syntax and semantic analysis by giving example.

Q.6. Check if following grammar is LL (1)
   S → iCtSS'| a , S → eS | €ïC→ b.

Q.7. Differentiate between SLR, LR(K) & LALR parser.

Q.8. Calculate first and follow for the following grammar?
   a) E-> E+T/T   T-> T*F/F   F-> (E)/id
   b) S->xABC   A->a|bbD   B->a|ε   C->b| ε   D->c| ε

Unit-III: Syntax Translation Schemes
Q1. Explain need for intermediate code & explain advantages of intermediate code.

Q.2. Explain the following terms
   1) Synthesized Attributes   2) Inherited Attributes
   3) Syntax Tree & DAG   4)Dependency graph
   5)Evaluation order   6)Directed Acyclic Graph (DAG)

Q.3. Generate intermediate code for following statement:
   a= b+c
   (Specify syntax directed translation scheme)

Q.4. Define: L-attributed grammar in detail.

Q.5.Write syntax directed translation scheme for Boolean expressions.

Q.6. Compare: Quadruple, Triple, Indirect Triple.

Unit-IV: Run-time Storage Management.
Q.1. Write the comparison among Static allocation, Stack allocation and Heap Allocation with their merits and limitations.

Q.2.What is Dangling Pointers? Explain its use in Compiler in detail.

Q.3. Write the definition of symbol table and procedure to store the names in symbol table.

Q.4. What are the data structures used in symbol table?

Q.5. What are the limitations of stack allocation?

Q.6. Write two important points about heap management.
Q.7.What is activation record? Write the various fields of Activation Record.
Q.8. What are the functions of error handler?
Q.9. Write a short note on Error Detection and Recovery.
Q.10. Classify the errors and discuss the errors in each phase of Compiler.

Unit-V: Code Generation

Q.1. What is next use information? Explain its use in code generation.
Q.2 What is Register Allocation & Assignment Problem.
Q.3. Write Short Note on :
    1) Peephole Optimization.   2) Applications of DAG in Code generation.
    3) Flow graph (with example)   4) Dominators
    5) Natural loops   6) Inner loops
    7) Reducible flow graphs   8)Dead code elimination
    9) Variable elimination   10) Code motion
    11) Reduction in strength
Q.4. What is code optimization? Explain machine dependent and independent code optimization.
Q.5. What is common sub-expression and how to eliminate it? Explain with example.
Q.6. What is control and data flow analysis? Explain with example

Unit-VI: Code Optimization

Q.1. Write the need for Code Optimization.
Q.2. Explain issues in Code Optimization.
Q.3. What are the patterns used for code optimization?
Q.4. Define local optimization.
Q.4. What are the properties of optimizing compilers?
Q.5. Explain Local transformation & Global Transformation in detail.
Q.6.   What is meant by Common Sub expressions?
Q.7. What are the techniques used for loop optimization?
Q.8. Explain the structure of general activation record in detail.

University Question Papers

Subject – 4

Elective IV - Cloud Computing 410253(C)

B. E. (Even Semester), Session 2018-2019
Scheme, Syllabus and Evaluation Guidelines, Of "Cloud Computing 410253(C)"

Course Code	Course Name	Lectures Assigned			
		Theory	Practical	Tutorial	Total
410253(C)	Cloud Computing	3	-	-	3

Course Code	Course Name	Examination Evaluation Scheme							Practical		
		Theory									
		Internal Assessment					Ext				
410253(C)	Cloud Computing	20	20	20	20	30	70	100	0	0	0

Elective IV
410253(C): Cloud Computing

Course Contents

Unit I   **08 Hours**
Basics of Cloud Computing
Overview, Applications, Intranets and the Cloud. Your Organization and Cloud Computing- Benefits, Limitations, Security Concerns. Software as a Service (SaaS)- Understanding the Multitenant Nature of SaaS Solutions, Understanding SOA. Platform as a Service (PaaS)-IT Evolution Leading to the Cloud, Benefits of Paas Solutions, Disadvantages of PaaS Solutions. Infrastructure as a Service (IaaS)- Understanding IaaS, Improving Performance through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages, Server Types. Identity as a Service (IDaaS).

08 Hours
Unit-II
Data Storage and Security in Cloud
Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo Cloud data stores: Datastore and Simple DB Gautam Shrauf, Cloud Storage-Overview, Cloud Storage Providers. [Anthony T. Velte]3
Securing the Cloud- General Security Advantages of Cloud-Based Solutions, Introducing Business Continuity and Disaster Recovery. Disaster Recovery- Understanding the Threats.

Unit III   **08 Hours**
Virtualization
Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Types of Hypervisors, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Center Automation. Common Standards: The Open Cloud Consortium, Open Virtualization Format, Standards for Application Developers: Browsers (Ajax), Data (XML, JSON), Solution Stacks (LAMP and LAPP),Syndication (Atom, Atom Publishing Protocol, and RSS), Standards for Security.

Unit-IV   **08 Hours**
Amazon Web Services
Services offered by Amazon Hands-on Amazon, EC2 - Configuring a server, Virtual Amazon Cloud, AWS Storage and Content Delivery Identify key AWS storage options Describe Amazon EBS Creating an Elastic Block Store Volume Adding an EBS Volume to an Instance Snap shotting an EBS Volume and Increasing Performance Create an Amazon S3 bucket and manage associated objects. AWS Load Balancing Service Introduction Elastic Load Balancer Creating and Verifying Elastic Load Balancer.

Unit V
Ubiquitous Clouds and the   **08 Hours**
Internet of Things
Cloud Trends in Supporting Ubiquitous Computing, Performance of Distributed Systems and the Cloud, Enabling Technologies for the Internet of Things (RFID, Sensor Networks and ZigBee Technology, GPS), Innovative Applications of the Internet of Things (Smart Buildings and Smart Power Grid, Retailing and Supply-Chain Management, Cyber-Physical System), Online Social and Professional Networking.

Unit VI   **08 Hours**
Future of Cloud Computing

How the Cloud Will Change Operating Systems, Location-Aware Applications, Intelligent Fabrics, Paints, and More, The Future of Cloud TV, Future of Cloud-Based Smart Devices, Faster Time to Market for Software Applications, Home-Based Cloud Computing, Mobile Cloud, Autonomic Cloud Engine, Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing. Docker at a Glance: Process Simplification, Broad Support and Adoption, Architecture, Getting the Most from Docker, The Docker Workflow.

Evaluation Guidelines:

Internal Assessment (IA) : [CT (20Marks)+TA/AT(10 Marks)]

Class Test (CT) [20 marks]:- Three class tests, 20 marks each, will be conducted in a semester and out of these three, the average of best two will be selected for calculation of class test marks. Format of question paper is same as university.

TA [5 marks]: Three/four assignments will be conducted in the semester. Teacher assessment will be calculated on the basis of performance in assignments, class test and pre-university test

Attendance (AT) [5 marks]: Attendance marks will be given as per university policy.

Paper pattern and marks distribution for Class tests:

5. Question paper will comprise of 3 Section A, B and C with internal choice of questions.
6. Section A contains 5 short answer type questions of 1 mark each. All questions are compulsory. (Total 5 Marks)
7. Section B contains 4 medium answer type questions of 2.5 marks each. All questions are compulsory. (Total 10 marks)
8. Section C contains 1 long answer type questions of 5 marks. (Total 5 marks)

In Semester Examination [30 Marks]
Paper pattern and marks distribution for PUT: Same as End semester exam

End Semester Examination [70 Marks]:
Paper pattern and marks distribution for End Semester Exam: As per university guidelines.

Lecture Plan
410253(C): Cloud Computing

1	Overview, Applications
2	Intranets and the Cloud.
3	Your Organization and Cloud Computing
4	Benefits, Limitations, Security Concerns.
5	Software as a Service (SaaS)- Understanding the Multitenant Nature of SaaS Solutions, Understanding SOA.
6	Platform as a Service (PaaS)-IT Evolution Leading to the Cloud, Benefits of Paas Solutions, Disadvantages of PaaS Solutions.
7	Infrastructure as a Service (IaaS)-Understanding IaaS, Improving Performance through Load Balancing
8	System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages, Server Types. Identity as a Service (IDaaS).
9	Cloud file systems: GFS and HDFS,
10	BigTable, HBase and Dynamo
11	Cloud data stores: Datastore Simple DB Gautam Shrauf ,
12	Cloud Storage-Overview, Cloud Storage Providers
13	Securing the Cloud- General Security
14	Advantages of Cloud-Based Solutions,
15	Introducing Business Continuity and Disaster Recovery
16	Disaster Recovery- Understanding the Threats
17	Implementation Levels of Virtualization,
18	Virtualization Structures/Tools and Mechanisms,
19	Types of Hypervisors, Virtualization of CPU, Memory, and I/O Devices
20	Virtual Clusters and Resource Management,
21	Virtualization for Data-Center Automation.
22	Common Standards: The Open Cloud Consortium, Open Virtualization Format,
23	Standards for Application Developers: Browsers (Ajax), Data (XML, JSON), Solution Stacks (LAMP and LAPP),
24	Syndication (Atom, Atom Publishing Protocol, and RSS), Standards for Security.
25	Services offered by Amazon
26	Hands-on Amazon, EC2 - Configuring a server,
27	Virtual Amazon Cloud, AWS Storage and Content Delivery
28	Identify key AWS storage options Describe Amazon EBS Creating an Elastic Block Store
29	Volume Adding an EBS Volume to an Instance Snap shotting an EBS Volume and Increasing Performance
30	Create an Amazon S3 bucket and manage associated objects
31	AWS Load Balancing Service Introduction Elastic Load Balancer
32	Creating and Verifying Elastic Load Balancer.
33	Cloud Trends in Supporting Ubiquitous Computing,
34	Performance of Distributed Systems and the Cloud
35	Enabling Technologies for the Internet of Things RFID, Sensor Networks
36	ZigBee Technology, GPS
37	Innovative Applications of the Internet of Things
38	Smart Buildings and Smart Power Grid,
39	Retailing and Supply-Chain Management, Cyber-Physical System

40	Online Social and Professional Networking.
41	How the Cloud Will Change Operating Systems
42	Location-Aware Applications, Intelligent Fabrics, Paints, and More,
43	The Future of Cloud TV, Future of Cloud-Based Smart Devices
44	Faster Time to Market for Software Applications,
45	Home-Based Cloud Computing, Mobile Cloud, Autonomic Cloud Engine,
46	Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing,
47	Docker at a Glance: Process Simplification, Broad Support and Adoption,
48	Architecture, Getting the Most from Docker, The Docker Workflow.

Course Delivery, Objectives, Outcomes
410253(C): Cloud Computing
Semester – 8

Course Delivery:
The course will be delivered through lectures, assignment/tutorial sessions, class room interaction, and presentations.

Course Objectives:
- To understand cloud computing concepts;
- To study various platforms for cloud computing
- To explore the applications based on cloud computing

Course Outcomes:
On completion of the course, student will be able to–

1. **CO1:** Apply basic, intermediate and advanced techniques to configure cloud.
2. **CO2:** To install cloud computing environments.
3. **CO3:** To develop any one type of cloud
4. **CO4:** To explore future trends of cloud computing

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2	2											
CO3	2											
CO4	2											

Justification Of CO-PO Mapping

JUSTIFICATION OF CO-PO MATCHING	
CO1 WITH PO1	Understand and Familiar with the basic concepts of cloud computing
CO2 WITH PO2	Understand how to build large scale distributed systems and cloud applications.
CO3 WITH PO3	Comprehend the importance of cloud security.
CO4 WITH PO4	Understand Ubiquitous Computing and applications.

Assignments (Cloud Computing)

Assignment 1

1. Define cloud computing?What are the advantages of "Software As A Service" (SaaS)?
2. What are main features of cloud services?

3. What is SOA in cloud computing? What Are The Main Features Of Soa?

4. What is an example of platform as a service? How does Platform as a service work?

5. Differentiate Beetween IaaS and PaaS

Assignment 2

1. Explain GFS & HDFS with example.

2. Write a short notes on HBase and Dynamo Cloud.

3. What is Cloud Storage? Explain with real time example.

4. What is HDFS? Name two layers in HDFS?

5. Explain Disaster Recovery and its Threats.

Assignment 3

1. What is virtualization? Explain Implementation levels of virtualizations

2. Discuss the architecture of hyper-Visor and discuss its use in cloud computing .

3. What is Memory virtualization? Explain two level memory mapping procedure?

4. Virtualization has come a long way. How do you see the technical and operational considerations of data center virtualization differ today versus previous years?

5. Explain LAMP & LAAP with example.

Assignment 4

1. Explain the storage services offered by Amazon EC2 Cloud.

2. Write a short note on Open Nebulla.

3. Describe Amazon EBS. How to add Volume in EBS? Explain step-by-step.

4. What is an Amazon s3 bucket?Explain.

5. What Is AWS Elastic Load Balancing (ELB)?How to verify ELB.

Assignment 5

1. Differentiate between Distributed Computing and Cloud Computing.

2. Discuss any four common myths about Ubiquitous Computing.

3. Explain RFID & ZigBee technologies using concept of IoT and Cloud.

4. Wrtie a short notes on Innovative Applications of the Internet of Things.
1) Smart Buildings and 2) Smart Power Grid

5. Describe Performance of Distributed Systems and the Cloud.

Assignment 6

1. How the Cloud Will Change Operating Systems?

2. Explain with example "Location-Aware Applications"

3. Explain in details the Future of Cloud-Based Smart Devices

4. Draw and explain CometCloud architecture for autonomic cloudbursts

5. Write a short note on-
    1) Client/Server Model
    2) Network Ports and Unix Sockets
    3) Robust Tooling
    4) Docker Command-Line Tool

QUESTION BANK

410253(C): Cloud Computing

Unit - I. Basics of Cloud Computing

Question No.	Questions	CO Mapped	Bloom's Taxonomy Level
01	Define cloud computing?What are the advantages of "Software As A Service" (SaaS)?	CO-3	2
02	What are main features of cloud services?	CO-5	3
03	What is SOA in cloud computing? What Are The Main Features Of Soa?	CO-1	2
04	What is an example of platform as a service? How does Platform as a service work?	CO-4	1
05	Differentiate Beetween IaaS and PaaS	CO-3	2

Unit – II:

Question No.	Questions	CO Mapped	Bloom's Taxonomy Level

01	Explain GFS & HDFS with example.	CO-3	2
02	Write a short notes on HBase and Dynamo Cloud.	CO-5	3
03	What is Cloud Storage? Explain with real time example.	CO-1	2
04	What is HDFS? Name two layers in HDFS?	CO-4	1
05	Explain Disaster Recovery and its Threats.	CO-3	2

Unit – III:

Question No.	Questions	CO Mapped	Bloom's Taxonomy Level
01	What is virtualization? Explain Implementation levels of virtualizations	CO-3	2
02	Discuss the architecture of hyper-Visor and discuss its use in cloud computing .	CO-5	3
03	What is Memory virtualization? Explain two level memory mapping procedure?	CO-1	2
04	Virtualization has come a long way. How do you see the technical and operational considerations of data center virtualization differ today versus previous years?	CO-4	1
05	Explain LAMP & LAAP with example.	CO-3	2

Unit – IV:

Question No.	Questions	CO Mapped	Bloom's Taxonomy Level
01	Explain the storage services offered by Amazon EC2 Cloud.	CO-3	2
02	Write a short note on Open Nebulla.	CO-5	3
03	Describe Amazon EBS. How to add Volume in EBS? Explain step-by-step.	CO-1	2
04	What is an Amazon s3 bucket?Explain.	CO-4	1
05	What Is AWS Elastic Load Balancing (ELB)?How to verify ELB.	CO-3	2

Unit – V:

Question No.	Questions	CO Mapped	Bloom's Taxonomy Level
01	Differentiate between Distributed Computing and Cloud Computing.	CO-3	2
02	Discuss any four common myths about Ubiquitous	CO-5	3

	Computing.		
03	Explain RFID & ZigBee technologies using concept of IoT and Cloud.	CO-1	2
04	Wrtie a short notes on Innovative Applications of the Internet of Things. 1) Smart Buildings and 2) Smart Power Grid	CO-4	1
05	Describe Performance of Distributed Systems and the Cloud.	CO-3	2

University Question Papers

Pravara Rural Education Society's
SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY, NASHIK
A/P. - Chincholi - 422102, Tal. Sinnar, Dist - Nashik (M.S.)
"Affiliated to University of Pune" Letter No. CA/1379 dt. 16/08/1998
Approved by AICTE, New Delhi Letter No. F -740-89-306(E) / ET/96 dtd. 15/10/1998
University ID No. 052   Institute Code 5125

Department of Chemical Engineering

SUMMARY OF CHESA ACTIVITIES of YEAR 2018-19

Year	Sr. No.	Name of event	Date	Number of students participants
2018-19	1	Chemcoalesce 2k19 (1) Spell Bee (2) Quizee Bee Buzz (3) Salt Act (4) Personality Twist (5) Miniature Model Expo (6) Tech-Charades (7) Crash the trash & make the best (8) Speak your Mind	22 & 23rd Feb. 2019	201
	2	Aptitude Test	2nd Feb. 2019	72
	3	Group Discussion	8th Jan. 2019	82
	4	CHEM-O_PHILIA: Quiz Competition	1st Jan. 2019	90
	5	ECLAT – i) Ignite Talk & ii) Personality Twist	14th Sept. 2018	39
	6	Engineers Day	14th Sept. 2018	92

HOD
Head Of Department
Department of Chemical Engineering
S. V. I. T, Chincholi,
Tal. Sinnar, Dist., Nashik-422101 (M.S.)

Pravara Rural Education Society's

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY, NASHIK
A/P. - Chincholi - 422102, Tal. Sinnar, Dist - Nashik (M.S.)

"Affiliated to University of Pune" Letter No. CA/1379 dt. 18/08/1998
Approved by AICTE, New Delhi Letter No. F -740-89-305(E) / ET/96 dtd. 15/10/1996
University ID No. 052   Institute Code 5126

Department of Chemical Engineering
Umang 2K19

Chemcoalesce -2K19

Name of Department	Chemical Engineering
Title of event	CHEMCOALESCE 2K19
Name of events organized	(1) Spell Bee (2) Quizee Bee Buzz (3) Salt Act (4) Personality Twist (5) Miniature Model Expo (6) Tech-Charades (7) Crash the trash & make the best (8) Speak your Mind
Date of event organized	22nd & 23rd Feb. 2019
Name of the coordinator of event	Mr. Rahul D. Patil, Asst. Prof. in Chemical Engg Miss. Rashmi Gupta, TE Chemical
No. of Attended (Students)	Spell Bee :18 Quizee Bee Buzz :24 Salt Act :36 Personality Twist :25 Miniature Model Expo :18 Tech-Charades :24 Crash the trash & make the best :32 Speak your Mind :24 **Total Participant** :201

Pravara Rural Education Society's

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY, NASHIK

A/P. - Chincholi - 422102, Tal. Sinnar, Dist - Nashik (M.S.)

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University ID No. 052   Institute Code 5125

PHOTO GALLERY

Inauguration of UMANG 2k19 Sovainer

Felicitation of Guest of Honor Mr. Samir Bhattad, Director, Mayuresh Enterprizes

Felicitaion of Shri Bharat Gogare, Joint Secretary, PRES Loni

Inauguration of Umang 2k19

Inauguration of Chemcoalesce 2k19

Pravara Rural Education Society's

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY, NASHI
A/P. - Chincholi - 422102, Tal. Sinnar, Dist - Nashik (M.S.)
"Affiliated to University of Pune" Letter No. CA/1379 dt. 15/08/1908
Approved by AICTE, New Delhi Letter No. F-740-89-308(E) / ET/96 dt. 15/10/1996
University ID No. 052   Institute Code 5125

Spell Bee Event Participant

Quizee BEE Buzz Event

Salt Act Event

Miniture Model Expo Event

Miniture Model Expo Event

Miniture Model Expo Event

Personality Twist Event

Tech-Charades Event

Pravara Rural Education Society's

SIR VISVESVARAYA INSTITUTE OF TECHNOLOGY, NASHIK
A/P. - Chincholi - 422102, Tal. Sinnar, Dist - Nashik (M.S.)

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University ID No. 052   Institute Code 5125

Crash the Trash & Make the best Event

Speak your mind Event

Prize distribution to the winner

Chemcoalesce Event's Winners group photograph

Dr. Amit Mahulkar, Research Scientist, Reliance Industry, Mumbai delivering the Prizes to the Winners

Dr. Amit Mahulkar, Research Scientist, Reliance Industry, Mumbai delivering the Prizes to the Winners

(Mr. Rahul D. Patil)
Coordinator CHESA

Prof.(Dr.) B.L.Pangarkar
HOD Chemical Engg.

A Report on "COGNIZIA 2K 19" celebration

Sir Visvesvaraya Institute Of Technology, Chincholi, Nashik

Electronics & Telecommunication Engineering Department

Subject: - "UMANG: TECHNO-CULTRAL CELEBRATION –COGNIZIA 2K19 at Department of E&TC Engineering"

Date: 22/02/2019-23/02/2019
Academic Year:-2018-19 Sem-II
Time: 9:00 to 5:00 PM
Venue: – Department of E&TC Engineering, SVIT Chincholi, Nashik

Engineering is not merely knowing and being knowledgeable; engineering is not merely analysis; engineering is not merely the possession of the capacity to get elegant solutions to non-existent engineering problems; engineering is practicing the art of the organized forcing of technological change.

Association of Electronics and Telecommunication Engineering has taken initiative to bring out the hard efforts of engineers. COGNIZIA is one of the biggest event organized every year by the E&TC Department of "Sir Visvesvaraya Institute Of Technology ",Chincholi, Nashik.

In these year, it's a part of the Techno-Cultural Event Umang 2K19.

A man who moves a mountain begins by carrying away small stones' the phrases of Confucius. The Cognizia platform will be a small stone to achieve a mountain success in terms of knowledge and talent.

In Congnizia 2K19 we had kept various events viz. Talash- Treasure Hunt, Brain it On- Faster Buzzer First , Tech Talk, Pythagoria-Geometric Master, Beat Em All.

The purpose of arranging these events is to make available a platform for the hidden talents in the Students. We are confident that, the said events will definitely give a good interaction among the students who are coming from different institutes. Apart from it, the Outside students will get an insight into the various facilities available in our Institute.
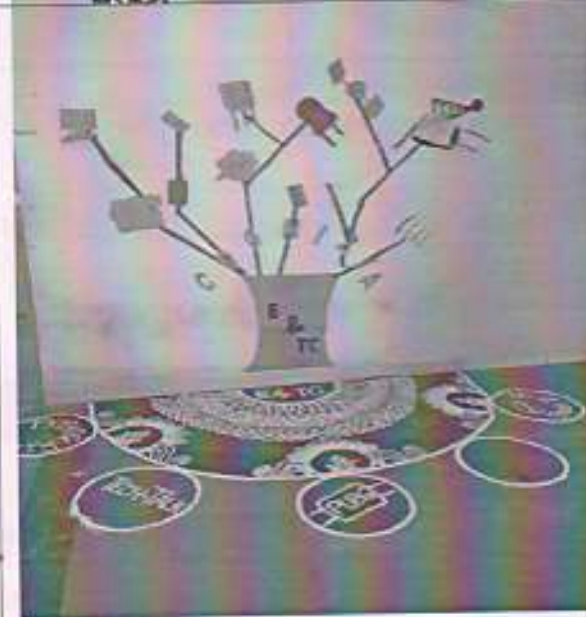
The Principal Prof. (Dr.) K. T. V. Reddy, Campus Director & Principal presided over the function. Mr. U. V. Patil , Head of Department E & TC was also present on the occasion. Mrs. Prerana Khairnar coordinated this event with team.

The Head of Department of E& TC Mr. U. V. Patil welcomed the gathering.

Picture Gallery:

Inauguration session:

Picture Gallery:
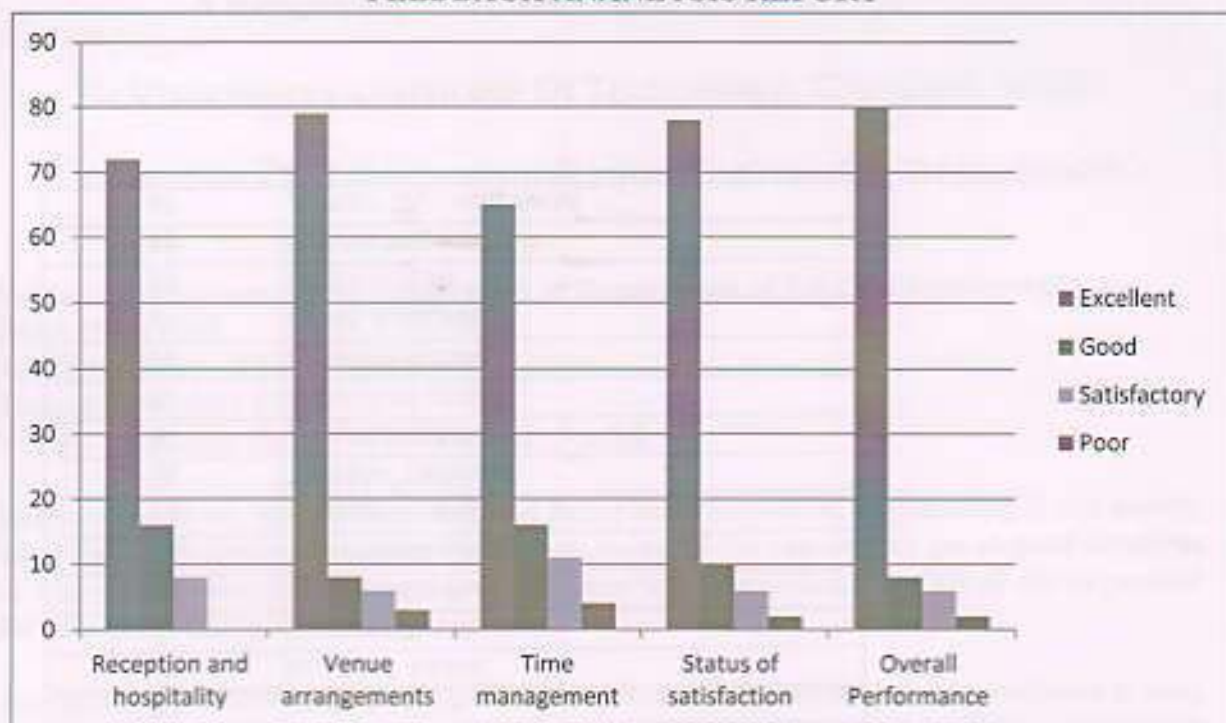
Inauguration session:

Excellence and Recognition Awards:

FEEDBACK ANANLYSIS REPORT

OUTCOMES:-

1. Students get the platform to show their qualities like leadership, management, team work etc.
2. Students get aware about the qualities in them.

We would specially like to thank Prof. (Dr.) K. T. V. Reddy, Mr. U. V. Patil, E&T.C Faculty; ASSET Team without their Support this event was not possible.
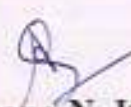
Approval Authority:

1. Prof.(Dr.)K. T. V. Reddy, Campus Director & Principal, SVIT, Chincholi, Nashik

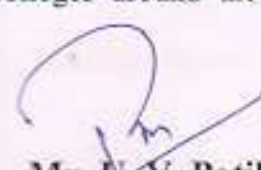2. Mr. U. V. Patil, Head of Department of E& TC

Main Coordinator of the Event:

1. Mrs. Prerana Khairnar (Technical committee Coordinator)

Participants Involved in Camp:

Students of SVIT Campus and participants from outsider colleges around the state. (Around 200 Students participated)

Mrs. Prerana N. Khairnar
Techno-cultral Cmt. Head, ASSET Staff In Charge

Mr. U. V. Patil
Vice Principal, H. O. D. E&TC Dept.
H.O.D.
Department of Electronics & Telecommunication Engg