The following are the syllabus copy as per anna university curriculum and relevant experiential learning document

1.3.2

COURSES THAT INCLUDE EXPERIENTIAL LEARNING THROUGH PROJECT WORK/ FIELD WORK/ INTERNSHIP DURING 2021-2022

NPR
College of Engineering & Technology
Approved by AICTE, Affiliated to Anna University,
Accredited by NAAC WITH 'A' GRADE|Recognized by UGC under 2 (f)
Natham, Dindigul - 624 401. Web: www.nprcet.org

NAAC

1.3.2 AVERAGE PERCENTAGE OF COURSES THAT INCLUDE EXPERIENTIAL LEARNING THROUGH PROJECT WORK/FIELD WORK/INTERNSHIP DURING 2021-2022

S. No.	Programme offering	Name of the course	Course code	Project / field work	Page No.
1.	B.E-Electronics and Communication Engineering	PHYSICS FOR ELECTRONICS ENGINEERING	PH3254	Industrial Visit	4
2.	B.E-Electronics & Communication Engineering	ELECTRICAL AND INSTRUMENTATION ENGINEERING	BE3254	Industrial visit	12
3.	B.E-Electronics & Communication Engineering	CIRCUIT ANALYSIS	EC3251	Industrial visit	20
4.	B.E-Electronics & Communication Engineering	ELECTRONIC CIRCUITS- I	EC8351	IPT	28
5.	B.E-Electronics & Communication Engineering	ELECTROMAGNETIC FIELDS	EC8451	Project work	51
6.	B.E-Electronics & Communication Engineering	FUNDAMENTALS OF DATA STRUCTURES IN C	EC8393	Project work	103
7.	B.E-Electronics & Communication Engineering	SIGNALS AND SYSTEMS	EC8352	Project work	32
8.	B.E-Electronics & Communication Engineering	ELECTRONIC CIRCUITS II	EC8452	IPT	44
9.	B.E-Electronics & Communication Engineering	DIGITAL ELECTRONICS	EC8392	Internship	37
10.	B.E-Electronics & Communication Engineering	CONTROL SYSTEMS ENGINEERING	EC8391	IPT	41
11.	B.E-Electronics & Communication Engineering	PROBABILITY AND RANDOM PROCESSES	MA8451	IPT	108
12.	B.E-Electronics & Communication Engineering	COMMUNICATION THEORY	EC8491	Internship	48
13.	B.E-Electronics & Communication Engineering	LINEAR INTEGRATED CIRCUITS	EC8453	IPT	57
14.	B.E-Electronics & Communication Engineering	DISCRETE TIME SIGNAL PROCESSING	EC8553	Project work	63
15.	B.E-Electronics & Communication Engineering	COMPUTER ARCHITECTURE AND ORGANIZATION	EC8552	Internship	69
16.	B.E-Electronics & Communication Engineering	COMMUNICATION NETWORKS	EC8551	Internship	73

17.	B.E-Electronics & Communication Engineering	BASICS OF BIOMEDICAL INSTRUMENTATION	OMD551	Project work	76
18.	B.E-Electronics & Communication Engineering	MICROPROCESSORS AND MICROCONTROLLERS	EC8691	Internship	81
19.	B.E-Electronics & Communication Engineering	VLSI DESIGN	EC8095	Internship	83
20.	B.E-Electronics & Communication Engineering	DIGITAL COMMUNICATION	EC8501	IPT	61
21.	B.E-Electronics & Communication Engineering	WIRELESS COMMUNICATION	EC8652	Project work	87
22.	B.E-Electronics & Communication Engineering	TRANSMISSION LINES AND RF SYSTEMS	EC8651	Project work	92
23.	B.E-Electronics & Communication Engineering	WIRELESS NETWORKS	EC8004	Project work	98
24.	B.E-Electronics & Communication Engineering	ANTENNA AND MICROWAVE ENGINEERING	EC8701	Project work	111
25.	B.E-Electronics & Communication Engineering	OPTICAL COMMUNICATION	EC8751	Internship	117
26.	B.E-Electronics & Communication Engineering	EMBEDDED AND REAL TIME SYSTEMS	EC8791	Project work	121
27.	B.E-Electronics & Communication Engineering	AD HOC AND SENSORS NETWORKS	EC8702	Internship	126
28.	B.E-Electronics & Communication Engineering	SATELLITE COMMUNICATION	EC8094	Internship	129
29.	B.E-Electronics & Communication Engineering	ADVANCED WIRELESS COMMUNICATION	EC8092	Project work	131
30.	B.E-Electronics & Communication Engineering	PROJECT WORK	EC8811	Project work	137

Dr. J.SUNDARARAJAH,
B.E., M.Tech. Ph.D.,
Principal
N.P.R. College of Engineering
Natham, Dindigul - 624 401

PH3254   **PHYSICS FOR ELECTRONICS ENGINEERING**   L   T   P   C

                                                                  3   0   0   3

COURSE OBJECTIVES:

- To make the students to understand the basics of crystallography and its importance instudying materials properties.
- To understand the electrical properties of materials including free electron theory,applications of quantum mechanics and magnetic materials.
- To instil knowledge on physics of semiconductors, determination of charge carriers anddevice applications
- To establish a sound grasp of knowledge on different optical properties of materials, opticaldisplays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuingnano device applications.

UNIT I   CRYSTALLOGRAPHY   9

Crystal structures: Crystal lattice – basis - unit cell and lattice parameters – crystal systems and Bravais lattices – Structure and packing fractions of SC, BCC, FCC, diamond cubic, NaCL, ZnS structures – crystal planes, directions and Miller indices – distance between successive planes – linear and planar densities – crystalline and noncrystalline materials –Example use of Miller indices: wafer surface orientation – wafer flats and notches – pattern alignment - imperfections in crystals.

UNIT II   ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS   9

Classical free electron theory - Expression for electrical conductivity – Thermal conductivity, expression - Quantum free electron theory :Tunneling – degenerate states -- Fermi- Dirac statistics– Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole. Magnetic materials: Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

UNIT III   SEMICONDUCTORS AND TRANSPORT PHYSICS   9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – Carrier transport in Semiconductors: Drift, mobility and diffusion – Hall effect and devices – Ohmic contacts– Schottky diode

UNIT IV   OPTICAL PROPERTIES OF MATERIALS   9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – laser diode - optical processes in organic semiconductor devices –excitonic state – Electro-optics and nonlinear optics: Modulators and switching devices – plasmonics.

UNIT V   NANO DEVICES   9

Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots –Band gap of nanomaterials –Tunneling – Single electron phenomena – Single electron Transistor. Conductivity of metallic nanowires – Ballistic transport – Quantum resistance and conductance – Carbon nanotubes: Properties and applications - Spintronic devices and applications – Optics in quantum structures – quantum well laser.

                                                                         TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able to

CO1:Know basics of crystallography and its importance for varied materials properties

CO2:Gain knowledge on the electrical and magnetic properties of materials and their applications CO3:understand clearly of semiconductor physics and functioning of semiconductor devices CO4:understand the optical properties of materials and working principles of various optical devicesCO5:appreciate the importance of nanotechnology and nanodevices.

TEXT BOOKS:

1. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (IndianEdition), 2020.
2. R.F.Pierret. Semiconductor Device Fundamentals. Pearson (Indian Edition), 2006.
3. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.

REFERENCES:

1. Laszlo Solymar, Walsh, Donald, Syms and Richard R.A., Electrical Properties ofMaterials, Oxford Univ. Press (Indian Edition) 2015.
2. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-HillEducation (Indian Edition), 2019.
3. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
4. Mark Fox, Optical Properties of Solids, Oxford Univ.Press, 2001.N.Gershenfeld. The Physics of Information Technology. Cambridge University Press, 2011.

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NPR Group of Institutions
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PERMISSION LETTER

From

Dr. T. Priya,

Head of the Department,

Department of Science and Humanities,

NPR College of Engineering & Technology,

Natham,

Dindigul – 624 401.

To

The Administrative Office,

NPR Group of Institutions,

Natham,

Dindigul – 624 401.

Through Proper Channel

Sir,

Sub: Requesting permission for Industrial visit – Reg.

This is to bring to your kind notice that we are planning to organize one day visit to **VEI Technologies** for the 1st Year students.

So, I request you to grant permission for 80 students from I Year (60 Boys & 20 Girls)and 2 staff members (Mr. P. Madasamy, AP/ Maths and Mrs.S.Visithra, AP/ Maths) on 18.12.2021to visit **VEI Technologies, Chennai.**

Kindly do the needful.

Thanking you,

Yours faithfully,

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

(Dr.T.Priya)

2

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REQUISITION LETTER

Gmail

Inbox

NPR S&H<hodmathematicsnprcet@gmail.com>

To: info@veitecnologies.com

Mon, DEC 13, 2021,
10.16 AM

Respected Sir,

Greetings...!

Our NPR College of engineering and technology is situated in Natham, Dindigul district in a lush green environment established with the objective of ensuring the personal and professional development of the students from rural backgrounds offering UG and PG courses.

It has been a regular practice in our Science and Humanities Department to arrange industrial visits for our students every semester to reputed engineering industries. Based on that, 40 I YEAR students and 2 staff members of our Science and Humanities department have planned to visit VEI **Technologies**. We assure you sir, our students will follow the safety rules and will not disturb your regular processes. We humbly request you to grant us permission for the same and to confirm the permission through letter or mail.

Thanks, and regards

Dr. T. Priya,

Professor & Head

Department of Science and Humanities,

NPRCET,

Natham.

Reply Forward

NPR College of Engineering & Technology

NPR Nagar, Natham, Dindigul - 624401, Tamil Nadu, India.
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CONFIRMATION LETTER FROM INDUSTRY

NPR S&H<hodmathematicsnprcet@gmail.com>

Mon, DEC 13, 2021, 10.16 AM

To: info@veitecnologies.com

Respected Sir,

Greetings...!

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Thanks, and regards

Dr. T. Priya,

Prof & HOD,

Department of Science and Humanities,

NPRCET,

Natham.

Reply Forward

Gmail

Inbox

info@veitechnologies.com

Wed, Dec 15,2021, 12.28 PM

To: hodmathematicsnprcet@gmail.com

Dear Madam,

We are happy to give permission for the industrial visit to your wards in VEI Technologies, Chennai. Kindly remind us one day in advance for the visit schedule also send the original letter copy with your hand during the visit.

Thanks and Regards,

Dr B Ezhilavan,

Managing Director,

VEI Technologies, Chennai.

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

4

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Reach the Star

Industrial Visit to VEI Technologies, Chennai
DEPARTMENT OF SCIENCE AND HUMANITIES
STUDENTS LIST

PLACE OF INDUSTRIAL VISIT: VEI Technologies, Chennai   DATE: 18.12.2021

S. NO	NAME OF THE STUDENT	DEPARTMENT	GENDER	SIGNATURE
1.	JEEVADHARANI P	EEE	FEMALE	
2.	LOGESH KUMAR B	EEE	MALE	
3.	LOGESHWARAN S	EEE	MALE	
4.	MOHAMED THOUFEEK	EEE	MALE	
5.	RAMYA M	EEE	FEMALE	
6.	SANTHOSH A	EEE	MALE	
7.	SANTHOSH KUMAR R	EEE	MALE	
8.	JEYAVARTYIHINI	EEE	FEMALE	
9.	KEERTHIKA P	EEE	FEMALE	
10.	LAARADOLLY S	EEE	FEMALE	
11.	KIRTHIKANANTH M	CSE	MALE	
12.	MOHAMMED ABDULA S	CSE	MALE	
13.	MUTHUARIVU K	CSE	MALE	
14.	PRAVEEN C	CSE	MALE	
15.	RAGHUL S P	CSE	MALE	
16.	AARIF H	CSE	MALE	
17.	AJAY KUMAR K	CSE	MALE	
18.	ANBARASAN P	CSE	MALE	
19.	ANBARASU S	CSE	MALE	
20.	ANBULINGAM E	CSE	MALE	
21.	APSARA JASMINE S	CSE	FEMALE	
22.	ARASUTHANGAPANDI M	CSE	MALE	
23.	ARUSHA BANU A	CSE	FEMALE	
24.	BABY SHALINI C	CSE	FEMALE	
25.	DHARANI T	CSE	FEMALE	
26.	SUSMITHA N	CSE	FEMALE	
27.	THESHAN BANU S	CSE	FEMALE	
28.	DHARANI R	ECE-A	FEMALE	
29.	DHARSHINI B	ECE-A	FEMALE	
30.	DIVYA DHARSINI G	ECE-A	FEMALE	
31.	DURGA S	ECE-A	FEMALE	
32.	GANESAN M	ECE-A	MALE	
33.	GOPINATH S	ECE-A	MALE	
34.	HARESHKUMAR K	ECE-A	MALE	
35.	HARIHARAN R	ECE-A	MALE	
36.	MOHAMED IMTHIYAS K	ECE-A	MALE	

7

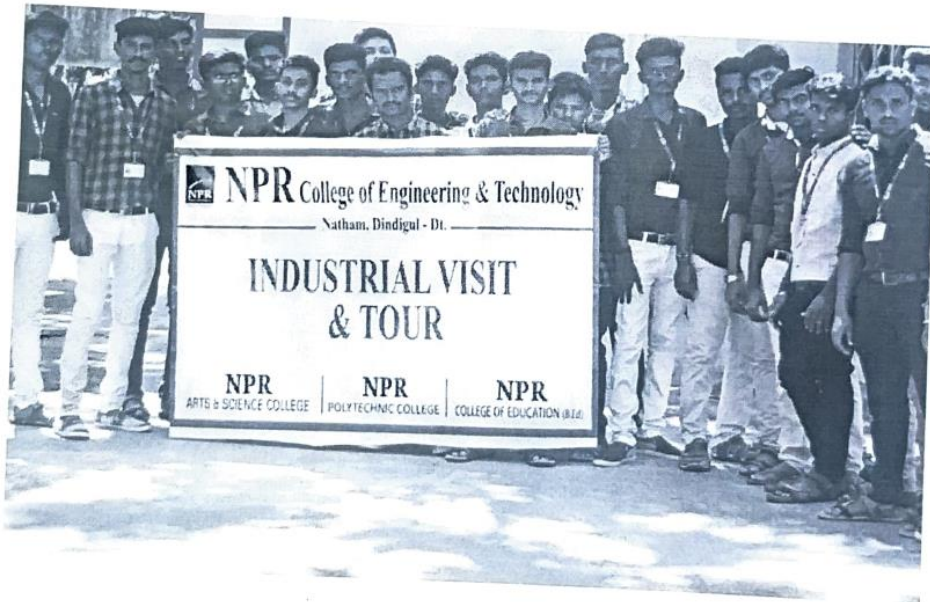| 37.	MOHAMMED HISSAM R	ECE-A	MALE	
38.	MOKESH NANDHU P	ECE-A	MALE	
39.	MUKESH VARMA M	ECE-A	MALE	
40.	NACHAMMAI C	ECE-A	FEMALE	
41.	AAKASH R	ECE-A	MALE	
42.	ABDUL RAHMAN A	ECE-A	MALE	
43.	ABHISHEK S	ECE-A	MALE	
44.	ALAGU PANDI P	ECE-A	MALE	
45.	ASHOK KUMAR S	ECE-A	MALE	
46.	BALURATHINAM B T	ECE-A	MALE	
47.	BHUWANESHWARAN B	ECE-A	MALE	
48.	CHINRAMAN V	ECE-A	MALE	
49.	DHANANJEYAN M	ECE-A	MALE	
50.	HARISHBALAJI E	ECE-A	MALE	
51.	HEMANTH BALA M	ECE-A	MALE	
52.	IMRANA Y	ECE-A	MALE	
53.	JOSEPH SAMUEL M	ECE-A	MALE	
54.	KALEESHWARAN M	ECE-A	MALE	
55.	KARTHICK B	ECE-A	MALE	
56.	LAKSHMANADHASAN S	ECE-A	MALE	
57.	LAKSHMANAN K	ECE-A	MALE	
58.	MANIKANDAN G	ECE-A	MALE	
59.	MANIKANDAN N	ECE-A	MALE	
60.	MANOJ KUMAR S	ECE-A	MALE	
61.	MELVIN MECVAAN J	ECE-A	MALE	
62.	MOHAMED BARUK S	ECE-A	MALE	
63.	SARANYA	ECE-B	MALE	
64.	PRIYA DHARSHINI S	ECE-B	MALE	
65.	SANGILI PERUMAL M	ECE-B	MALE	
66.	SIVA BALAN S	ECE-B	MALE	
67.	SIVABALAJI M	ECE-B	MALE	
68.	SUBASH CHANDRA BOSE S	ECE-B	MALE	
69.	NEHA A	ECE-B	FEMALE	
70.	NITHISHKUMAR K	ECE-B	MALE	
71.	NITHYASRI R	ECE-B	FEMALE	
72.	PARTHA SARATHI K	ECE-B	MALE	
73.	NADHIYA M	ECE-B	FEMALE	
74.	TAMILARASI C	ECE-B	FEMALE	
75.	RAGUL M	ECE-B	MALE	
76.	RAMAPRABAKARAN R	ECE-B	MALE	
77.	RAMJI M	ECE-B	MALE	
78.	RAVIKUMAR S	ECE-B	MALE	
79.	SABARI PRASATH P	ECE-B	MALE	
80.	SAKTHI PRASANNA M	ECE-B	MALE	

HOD-I YEAR

(Dr. Priya)

PRINCIPAL
Dr. J.SUNDARARAJAN,
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Principal
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Natham, Dindigul (Dt) - 624 401.

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Industrial Visit to VEI Technologies, Chennai

PHOTO GALLERY

Students are standing in front of VEI Technologies

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

14

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Industrial Visit to VEI Technologies, Chennai

SUMMARY REPORT

The purpose of the visit was to provide the students with an opportunity to gain practical knowledge about the functioning of an industry and its various departments. The visit was attended by a I year Students from NPR CET and took place on December.18th.2021. We were picked up from NPR CET at 9:30 pm and travelled by bus to Chennai. We reached Chennai at 6:00 am and returned to NPR CET at 5:00 am the next day.

VEI Technologies, is R&D company with proficient web development and software solution company based in Chennai. They offer an extensive range of services to reach our targeted spectators and carve up our valuable information focusing on retaining their customers.

From 9:00 am to 12:00 pm, the students visited VEI Technologies and were given a guided tour of the facility. They were able to see the various departments in action and understand the working of the industry.

We met the Director of the company, Mr. Babu Ezhilavan, Poonamallee, Chennai, where the company staff explained about some of their services, Web application development, Website designing, corporate profiles and presentations, E-commerce solutions, Application development, maintenance, and re- engineering, Mail gateways, Web hosting solutions, Search Engine Optimization, and Flash development.

They interacted with students very well and gave us an insight about the value added courses they provide on IOT, Java and Python. Students are also asked some questions regarding the courses to them and cleared their doubts.

From 12:00 pm to 1:00 pm, the students had their lunch at a nearby restaurant. From 1:00 pm to 3:00 pm, the students visited the planetarium, followed by a visit to the zoo from 3:00 pm to 5:00 pm, and then a visit to the beach from 5:00 pm to 6:30 pm. The students started to return at 8:00 pm and reached NPRCET at 5:00 am the next day.

Overall, the industrial visit to VEI Technologies in Chennai was a valuable experience for the students to understand the practical aspects of an industry and its functioning. The visit was well-organized and provided a good balance between the industrial visit and leisure activities.

1. S. Visithva.
2. P. Madasamy
Faculty Co-ordinators

1. S. Visithva, AP/Maths
2. P. Madasamy, AP/Maths.

HOD-I Year
(Dr. T.Priya)

IQAC

Coordinator - IQAC
NPR College of Engineering & Technology,
Natham, Dindigul (Dt)-624 401.

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology

15

BE3254 **ELECTRICAL AND INSTRUMENTATION ENGINEERING** **L T P C**
3 0 0 3

COURSE OBJECTIVES :

- To impart knowledge in types, construction and working of transformers
- To impart knowledge in types, construction and working of DC machines
- To impart knowledge in types, construction and working of AC rotating machines
- To introduce the functional elements and working of measuring instruments.
- To introduce the basics of power system and protection schemes

UNIT I   TRANSFORMER   9

Introduction - Ideal and Practical Transformer – Phasor diagram– Per Unit System – Equivalent circuit- Testing- Efficiency and Voltage Regulation– Three Phase Transformers –Applications- Auto Transformers, Advantages- Harmonics.

UNIT II   DC MACHINES   9

Introduction – Constructional Features– Motor and Generator mode - EMF and Torque equation – Circuit Model – Methods of Excitation- Characteristics – Starting and Speed Control – Universal Motor- Stepper Motors – Brushless DC Motors- Applications

UNIT III   AC ROTATING MACHINES   9

Principle of operation of three-phase induction motors – Construction –Types – Equivalent circuit, Speed Control - Single phase Induction motors -Construction– Types–starting methods. Alternator: Working principle–Equation of induced EMF – Voltage regulation, Synchronous motors- working principle-starting methods – Torque equation.

UNIT IV   MEASUREMENTS AND INSTRUMENTATION   9

Functional elements of an instrument , Standards and calibration, Operating Principle , types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, InstrumentTransformers-CT and PT,DSO- Block diagram- Data acquisition.

UNIT V   BASICS OF POWER SYSTEMS   9

Power system structure -Generation , Transmission and distribution , Various voltage levels, Earthing – methods of earthing, protective devices- switch fuse unit- Miniature circuit breaker- moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid

TOTAL: 45 PERIODS

COURSE OUTCOMES :

After completing this course, the students will be able to
CO1: Explain the working principle of electrical machines
CO2: Analyze the output characterizes of electrical machines
CO3: Choose the appropriate electrical machines for various applications
CO4: Explain the types and operating principles of measuring instruments
CO5: Explain the basic power system structure and protection schemes

TEXT BOOKS:

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition,McGraw Hill Education, 2020
2. S. K, Bhattacharya, "Basic Electrical and Electronics Engineering", Second Edition, PearsonEducation, 2017.
3. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements &
   Instrumentation', Dhanpat Rai and Co, New Delhi, 2015.
4.C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New AgeInternational pvt.ltd.,2003

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw HillEducation, 2019
2. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series,McGraw Hill, 2002.
3. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

Dr. J.SUNDARARAJAN,
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COLLEGE OF ENGG. & TECHNOLOGY
NATHAM

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PERMISSION LETTER

From

Dr. T. Priya,

Head of the Department,

Department of Science and Humanities,

NPR College of Engineering & Technology,

Natham,

Dindigul – 624 401.

To

The Administrative Office,

NPR Group of Institutions,

Natham,

Dindigul – 624 401.

Through Proper Channel

Sir,

Sub: Requesting permission for Industrial visit – Reg.

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So, I request you to grant permission for 80 students from I Year (60 Boys & 20 Girls)and 2 staff members (Mr. P. Madasamy, AP/ Maths and Mrs.S.Visithra, AP/ Maths) on 18.12.2021to visit **VEI Technologies, Chennai.**

Kindly do the needful.

Thanking you,

Yours faithfully,

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

(Dr.T.Priya)

NATHAM

2

REQUISITION LETTER

Gmail

Inbox

NPR S&H<hodmathematicsnprcet@gmail.com>

To: info@veitecnologies.com

Mon, DEC 13, 2021,
10.16 AM

Respected Sir,

Greetings...!

Our NPR College of engineering and technology is situated in Natham, Dindigul district in a lush green environment established with the objective of ensuring the personal and professional development of the students from rural backgrounds offering UG and PG courses.

It has been a regular practice in our Science and Humanities Department to arrange industrial visits for our students every semester to reputed engineering industries. Based on that, 40 I YEAR students and 2 staff members of our Science and Humanities department have planned to visit VEI **Technologies**. We assure you sir, our students will follow the safety rules and will not disturb your regular processes. We humbly request you to grant us permission for the same and to confirm the permission through letter or mail.

Thanks, and regards

Dr. T. Priya,

Professor & Head

Department of Science and Humanities,

NPRCET,

Natham.

Reply Forward

3

NPR College of Engineering & Technology
NPR Nagar, Natham, Dindigul - 624401, Tamil Nadu, India.
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.
An ISO 9001:2015 Certified Institution.
Phone No: 04544- 246 500, 246501, 246502.
Website : www.nprcolleges.org, www.nprcet.org, Email:nprcetprincipal@nprcolleges.org

ISO 9001

CONFIRMATION LETTER FROM INDUSTRY

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Thanks and Regards,
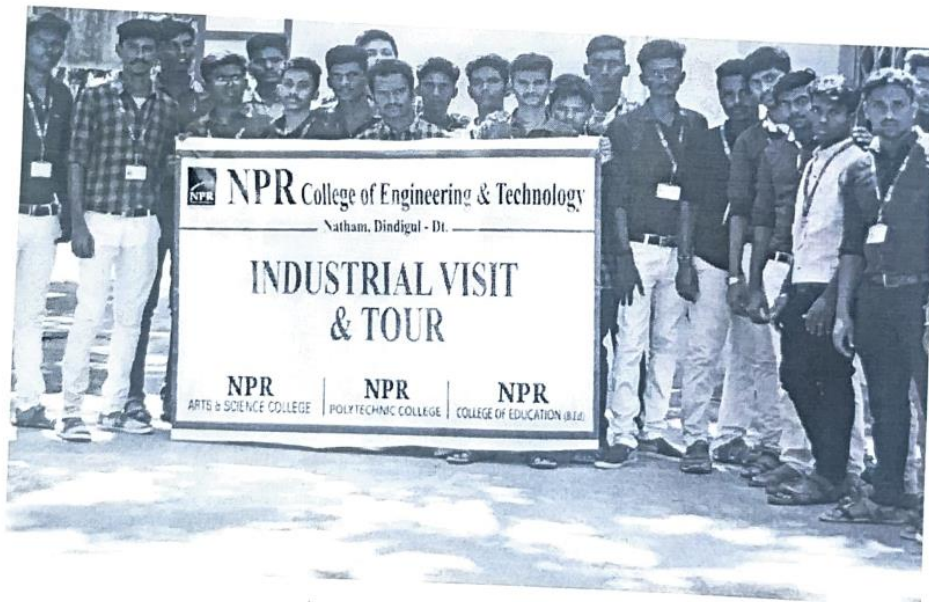
Dr B Ezhilavan,

Managing Director,

VEI Technologies, Chennai

Dr. J.SUNDARARAJAN,
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Industrial Visit to VEI Technologies, Chennai
DEPARTMENT OF SCIENCE AND HUMANITIES
STUDENTS LIST

PLACE OF INDUSTRIAL VISIT: VEI Technologies, Chennai   **DATE: 18.12.2021**

S. NO	NAME OF THE STUDENT	DEPARTMENT	GENDER	SIGNATURE
1.	JEEVADHARANI P	EEE	FEMALE	
2.	LOGESH KUMAR B	EEE	MALE	
3.	LOGESHWARAN S	EEE	MALE	
4.	MOHAMED THOUFEEK	EEE	MALE	
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78.	RAVIKUMAR S	ECE-B	MALE	
79.	SABARI PRASATH P	ECE-B	MALE	
80.	SAKTHI PRASANNA M	ECE-B	MALE	

HOD-I YEAR
(D.ஈ.பிரியா)

PRINCIPAL
Dr. J.SUNDARARAJAN,
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ISO 9001

Industrial Visit to VEI Technologies, Chennai

<u>PHOTO GALLERY</u>

Students are standing in front of VEI Technologies

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Industrial Visit to VEI Technologies, Chennai

SUMMARY REPORT

The purpose of the visit was to provide the students with an opportunity to gain practical knowledge about the functioning of an industry and its various departments. The visit was attended by a I year Students from NPR CET and took place on December.18th.2021. We were picked up from NPR CET at 9:30 pm and travelled by bus to Chennai. We reached Chennai at 6:00 am and returned to NPR CET at 5:00 am the next day.

VEI Technologies, is R&D company with proficient web development and software solution company based in Chennai. They offer an extensive range of services to reach our targeted spectators and carve up our valuable information focusing on retaining their customers.

From 9:00 am to 12:00 pm, the students visited VEI Technologies and were given a guided tour of the facility. They were able to see the various departments in action and understand the working of the industry.

We met the Director of the company, Mr. Babu Ezhilavan, Poonamallee, Chennai, where the company staff explained about some of their services, Web application development, Website designing, corporate profiles and presentations, E-commerce solutions, Application development, maintenance, and re- engineering, Mail gateways, Web hosting solutions, Search Engine Optimization, and Flash development.

They interacted with students very well and gave us an insight about the value added courses they provide on IOT, Java and Python. Students are also asked some questions regarding the courses to them and cleared their doubts.

From 12:00 pm to 1:00 pm, the students had their lunch at a nearby restaurant. From 1:00 pm to 3:00 pm, the students visited the planetarium, followed by a visit to the zoo from 3:00 pm to 5:00 pm, and then a visit to the beach from 5:00 pm to 6:30 pm. The students started to return at 8:00 pm and reached NPRCET at 5:00 am the next day.

Overall, the industrial visit to VEI Technologies in Chennai was a valuable experience for the students to understand the practical aspects of an industry and its functioning. The visit was well-organized and provided a good balance between the industrial visit and leisure activities.

1. S. Visithra.
2. P. Madasamy
Faculty Co-ordinators

1. S. Visithra, AP/Maths
2. P. Madasamy, AP/Maths

HOD-I Year
(Dr. TPriya)

IQAC
Coordinator - IQAC
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Principal
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15

EC3251   CIRCUIT ANALYSIS   L T P C
3 1 0 4

COURSE OBJECTIVES:

- To learn the basic concepts and behaviour of DC and AC circuits.
- To understand various methods of circuit/ network analysis using network theorems.
- To understand the transient and steady state response of the circuits subjected to DC excitations and AC with sinusoidal excitations.
- To learn the concept of coupling in circuits and topologies.

UNIT I   DC CIRCUIT ANALYSIS   12

Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff's Current Law, Kirchoff's voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.

UNIT II   NETWORK THEOREM AND DUALITY   12

Useful Circuit Analysis techniques - Linearity and superposition, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion. Duals, Dual circuits. Analysis using dependent current sources and voltage sources

UNIT III   SINUSOIDAL STEADY STATE ANALYSIS   12

Sinusoidal Steady – State analysis , Characteristics of Sinusoids, The Complex Forcing Function, The Phasor, Phasor relationship for R, L, and C, impedance and Admittance, Nodal and Mesh Analysis, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power.

UNIT IV   TRANSIENTS AND RESONANCE IN RLC CIRCUITS   12

Basic RL and RC Circuits, The Source- Free RL Circuit, The Source-Free RC Circuit, The Unit-Step Function, Driven RL Circuits, Driven RC Circuits, RLC Circuits, Frequency Response, Parallel Resonance, Series Resonance, Quality Factor.

UNIT V   COUPLED CIRCUITS AND TOPOLOGY   12

Magnetically Coupled Circuits, mutual Inductance, the Linear Transformer, the Ideal Transformer, An introduction to Network Topology, Trees and General Nodal analysis, Links and Loop analysis.

SUGGESTED ACTIVITIES:

- Practice solving variety of problems

COURSE OUTCOMES

On successful completion of this course, the student will be able to,

CO1: Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current andnode voltage method for analysis of DC and AC circuits.

CO2: Apply suitable network theorems and analyze AC and DC circuits

CO3: Analyze steady state response of any R, L and C circuits

CO4: Analyze the transient response for any RC, RL and RLC circuits and frequency responseof parallel and series resonance circuits.

CO5: Analyze the coupled circuits and network topologies

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis",Mc Graw Hill education,9th Edition, 2018.
2. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", Mc Graw-Hill, 2nd Edition, 2003.
3. Joseph Edminister and Mahmood Nahvi, —Electric Circuits, Schaum's Outline Series, TataMcGraw Hill Publishing New Delhi, Fifth Edition Reprint 2016.

REFERENCES:

1. Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition, 2014. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7thEdition, 2009.
2. John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The Mc Graw Hill companies, 2nd Edition, 2011
3. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition.

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PERMISSION LETTER

From

Dr. T. Priya,

Head of the Department,

Department of Science and Humanities,

NPR College of Engineering & Technology,

Natham,

Dindigul – 624 401.

To

The Administrative Office,

NPR Group of Institutions,

Natham,

Dindigul – 624 401.

Through Proper Channel

Sir,

Sub: Requesting permission for Industrial visit – Reg.

This is to bring to your kind notice that we are planning to organize one day visit to **VEI Technologies** for the 1st Year students.

So, I request you to grant permission for 80 students from I Year (60 Boys & 20 Girls)and 2 staff members (Mr. P. Madasamy, AP/ Maths and Mrs.S.Visithra, AP/ Maths) on 18.12.2021to visit **VEI Technologies, Chennai.**

Kindly do the needful.

Thanking you,

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
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Natham, Dindigul (Dt) - 624 401.

Yours faithfully,

(Dr.T.Priya)

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Reach the Star

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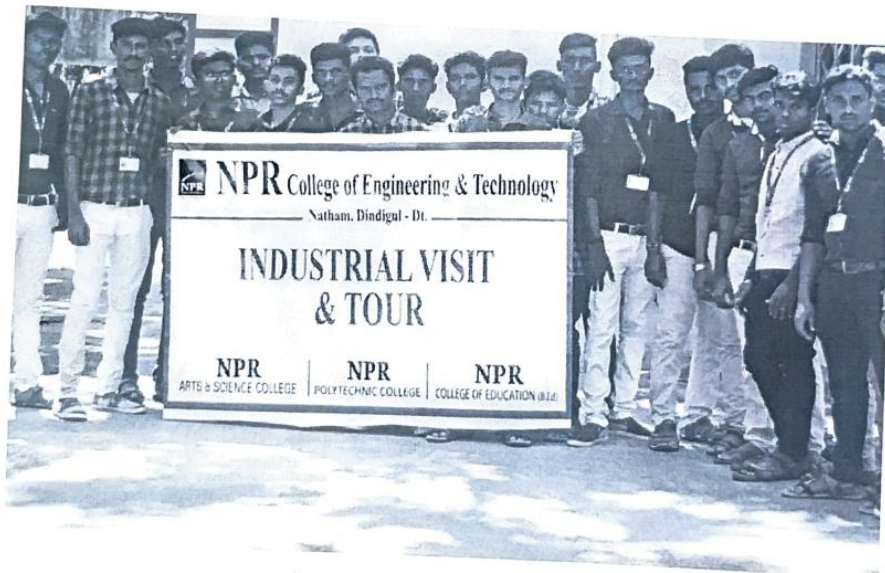
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78.	RAVIKUMAR S	ECE-B	MALE	
79.	SABARI PRASATH P	ECE-B	MALE	
80.	SAKTHI PRASANNA M	ECE-B	MALE	

HOD-I YEAR

(Dr. P. Priya)

PRINCIPAL

Dr. J. SUNDARARAJAN,

B.E., M.Tech., Ph.D.,

Principal

N.P.R. College of Engineering & Technology

Natham, Dindigul (Dt) - 624 401.

NPR College of Engineering & Technology

NPR Nagar, Natham, Dindigul - 624401, Tamil Nadu, India.
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.
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Industrial Visit to VEI Technologies, Chennai

PHOTO GALLERY

Students are standing in front of VEI Technologies

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Industrial Visit to VEI Technologies, Chennai

SUMMARY REPORT

The purpose of the visit was to provide the students with an opportunity to gain practical knowledge about the functioning of an industry and its various departments. The visit was attended by a I year Students from NPR CET and took place on December.18th.2021. We were picked up from NPR CET at 9:30 pm and travelled by bus to Chennai. We reached Chennai at 6:00 am and returned to NPR CET at 5:00 am the next day.

VEI Technologies, is R&D company with proficient web development and software solution company based in Chennai. They offer an extensive range of services to reach our targeted spectators and carve up our valuable information focusing on retaining their customers.

From 9:00 am to 12:00 pm, the students visited VEI Technologies and were given a guided tour of the facility. They were able to see the various departments in action and understand the working of the industry.

We met the Director of the company, Mr. Babu Ezhilavan, Poonamallee, Chennai, where the company staff explained about some of their services, Web application development, Website designing, corporate profiles and presentations, E-commerce solutions, Application development, maintenance, and re- engineering, Mail gateways, Web hosting solutions, Search Engine Optimization, and Flash development.

They interacted with students very well and gave us an insight about the value added courses they provide on IOT, Java and Python. Students are also asked some questions regarding the courses to them and cleared their doubts.

From 12:00 pm to 1:00 pm, the students had their lunch at a nearby restaurant. From 1:00 pm to 3:00 pm, the students visited the planetarium, followed by a visit to the zoo from 3:00 pm to 5:00 pm, and then a visit to the beach from 5:00 pm to 6:30 pm. The students started to return at 8:00 pm and reached NPRCET at 5:00 am the next day.

Overall, the industrial visit to VEI Technologies in Chennai was a valuable experience for the students to understand the practical aspects of an industry and its functioning. The visit was well-organized and provided a good balance between the industrial visit and leisure activities.

1. S. Visithra.
2. P. Madasamy
Faculty Co-ordinators
1. S. Visithra, AP/Maths
2. P. Madasamy, AP/Maths

HOD-I Year
(Dr. J.Priya)

IQAC
Coordinator - IQAC
NPR College of Engineering & Technology,
Natham, Dindigul (Dt)-624 401

Principal
Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology

15

EC8351	ELECTRONICCIRCUITSI	L	T	P	C
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OBJECTIVES:
- Tounderstandthemethodsofbiasingtransistors
- To designand analyze singlestageandmultistage amplifiercircuits
- Toanalyzethefrequencyresponseofsmallsignalamplifiers
- To designand analyze theregulated DCpowersupplies.
- Totroubleshootandfaultanalysisof powersupplies.

UNITI   BIASINGOFDISCRETEBJT,JFETANDMOSFET   9
BJT– Need for biasing - DC Load Line and Bias Point – DC analysis of Transistor circuits -
VariousbiasingmethodsofBJT–BiasCircuitDesign-Thermalstability-Stabilityfactors-
Biascompensation techniques using Diode, thermistor and sensistor – Biasing BJT Switching
Circuits-JFET - DC Load Line and Bias Point - Various biasing methods ofJFET - JFET Bias
CircuitDesign-MOSFET Biasing-BiasingFETSwitchingCircuits.

UNITII   BJTAMPLIFIERS   9
Small Signal Hybrid π equivalent circuit of BJT – Early effect - Analysis of CE, CC and
CBamplifiers using Hybrid πrequivalentcircuits - AC LoadLine Analysis- Darlington Amplifier -
Bootstraptechnique-Cascade,Cascodeconfigurations-Differentialamplifier,BasicBJTdifferentialpair
–Small signalanalysisandCMRR.

UNITIII   SINGLESTAGEFET,MOSFETAMPLIFIERS   9
SmallSignalHybridπrequivalentcircuitofFETandMOSFET-AnalysisofCS,CDandCG
amplifiersusingHybridπrequivalentcircuits-BasicFETdifferentialpair-BiCMOS circuits.

UNITIV   FREQUENCYRESPONSEOF AMPLIFIERS   9
Amplifierfrequencyresponse–Frequencyresponseoftransistoramplifierswithcircuitcapacitors
– BJT frequency response – short circuit current gain - cut off frequency – fα, fβ and unity
gainbandwidth – Miller effect - frequency response ofFET - High frequency analysis of CE
andMOSFETCSamplifier-TransistorSwitchingTimes.

UNITV   POWER SUPPLIESAND ELECTRONICDEVICETESTING   9
Linear mode power supply -Rectifiers - Filters - Half-Wave Rectifier Power Supply - Full-
WaveRectifierPowerSupply-Voltageregulators:Voltageregulation-Linearseries,shuntandswitching
Voltage Regulators - Over voltage protection - BJT and MOSFET – Switched modepower supply
(SMPS) - Power Supply Performance and Testing - Troubleshooting and
FaultAnalysis,DesignofRegulatedDC PowerSupply.

TOTAL: 45   PERIODS

OUTCOMES:
Afterstudyingthiscourse,thestudentshouldbeableto:
- Acquireknowledgeof
  - Workingprinciples, characteristicsandapplicationsof BJTandFET
  - Frequencyresponsecharacteristicsof BJTandFETamplifiers
- AnalyzetheperformanceofsmallsignalBJTandFETamplifiers-
  singlestageandmultistageamplifiers
- Applytheknowledgegainedinthedesignof Electroniccircuits

TEXT BOOKS:
1. Donald.A.Neamen,ElectronicCircuitsAnalysisandDesign,3rdEdition,McGrawHillEducation(Ind
   ia)PrivateLtd.,2010.(UnitI-IV)
2. RobertL.BoylestadandLouisNasheresky,"ElectronicDevicesandCircuitTheory",11thEdition,Pe
   arsonEducation,2013.(UnitV)

REFERENCES
1. MillmanJ,Halkias.C.andSathyabradaJit,ElectronicDevicesandCircuits,4thEdition,McGrawHill
   Education(India)PrivateLtd.,2015.

2. Salivahanan and N. Suresh Kumar, Electronic Devices and Circuits, 4th Edition,, McGraw Hill Education(India)Private Ltd., 2017.
3. Floyd, Electronic Devices, Ninth Edition, Pearson Education, 2012.
4. David A. Bell, Electronic Devices & Circuits, 5th Edition, Oxford University Press, 2008.
5. Anwar A. Khan and Kanchan K. Dey, A First Course on Electronics, PHI, 2006.
6. Rashid M, Microelectronics Circuits, Thomson Learning, 2007.

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8

Date: 10.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. MEERA JAFRIN.A (920820106024)** doing Second year B.E, Electronics and Communication Engineering in NPR College of Engineering & Technology, Natham has undergone the In-plant training program offered by our organization during the period of 03.03.22 – 10.03.22

We wish her every success in life.

For Megatronics,

(C.Kannan)

NATHAM

Principal
N.P.R. College of Engineering & Technolo
Natham, Dindigul (Dt) - 624 401

Megatronics
65, R.K. Mills 'B' Colony, Peelamedu Pudur, Coimbatore - 641 004.
Cell : 98422-85001   Phone : 0422 - 256 5001   E-mail : megatronicsindia@gmail.com
Web : www.megatronicsindia.in

Vi Microsystems Pvt. Ltd.,
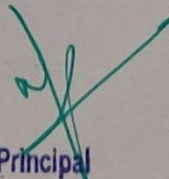
Date: 15.03.2022

TO WHOM IT MAY CONCERN

This is to certify that **Ms.Aarthy M (920820106001)** studying in Second year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone In-Plant training in our organization for 8 days from 08.03.2022 to 15.03.2022.
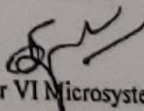
During the period, her conduct was found to be good.

With Regards

Principal
J.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401

For VI Microsystems

EC8352   SIGNALSANDSYSTEMSL   L T P C
                                                           4 0 0 4
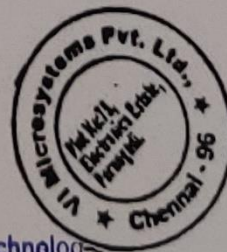
OBJECTIVES:
- To understandthebasicpropertiesofsignal&systems
- To knowthemethodsofcharacterization ofLTIsystemsintimedomain
- To analyzecontinuoustimesignalsandsysteminthe FourierandLaplacedomain
- To analyzediscretetimesignalsand systemin the FourierandZtransformdomain

UNITI   CLASSIFICATIONOFSIGNALSANDSYSTEMS   12
Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids_Classification ofsignals – Continuous time (CT) and Discrete Time (DT) signals, Periodic &Aperiodic signals, Deterministic & Random signals, Energy & Power signals - Classification ofsystems- CT systems and DT systems- – Linear & Nonlinear, Time-variant & Time-invariant,Causal&Non-causal,Stable&Unstable.

UNITII   ANALYSISOF CONTINUOUSTIMESIGNALS   12
Fourierseriesforperiodicsignals-FourierTransform–properties-LaplaceTransformsandproperties

UNITIII   LINEARTIMEINVARIANTCONTINUOUSTIMESYSTEMS   12
Impulseresponse-convolutionintegrals-DifferentialEquation-FourierandLaplacetransformsinAnalysisofCT systems-Systemsconnectedinseries/parallel.

UNITIV   ANALYSISOFDISCRETETIMESIGNALS   12
BasebandsignalSampling–Fouriertransformofdiscretetimesignals(DTFT)–PropertiesofDTFT-ZTransform&Properties

UNITV   LINEAR TIMEINVARIANT-DISCRETETIMESYSTEMS   12
Impulse response – Difference equations-Convolution sum- Discrete Fourier Transform and ZTransform Analysis of Recursive & Non-Recursive systems-DT systems connected in series andparallel.

                                                    TOTAL:60PERIODS

OUTCOMES:
Atthe endofthecourse,thestudentshouldbe able to:
- Tobeabletodetermine ifagiven systemislinear/causal/stable
- Capableofdeterminingthefrequencycomponentspresentinadeterministicsignal
- Capableof characterizingLTIsystemsinthetimedomainandfrequencydomain
- Tobeabletocomputetheoutputof anLTIsysteminthetimeandfrequencydomains

TEXTBOOK:
1. AllanV.Oppenheim,S.WilskyandS.H.Nawab,"SignalsandSystems",Pearson,2015.(Unit1-V)

REFERENCES
1. B.P.Lathi,"PrinciplesofLinearSystemsandSignals",Second Edition,Oxford,2009.
2. R.E.Zeimer,W.H.TranterandR.D.Fannin,"Signals&Systems-ContinuousandDiscrete",Pearson,2007.
3. John AlanStuller,"An Introduction to SignalsandSystems",Thomson,2007.

9

MACHINE TO MACHINE MESSAGING MECHANISM USING WSN FOR FAULT TOLERANT OPERATIONS

A PROJECT REPORT

Submitted by

PONBHARATHI.V	**(920818106020)**
PUGALARASU.S	**(920818106022)**
SATHISH KUMAR.G	**(920818106028)**

in partial fulfillment for the award of thedegree

of

BACHELOR OF ENGINEERING
in

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY

NATHAM, DINDIGUL.

ANNA UNIVERSITY :: CHENNAI 600 025

JUNE 2022

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ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**MACHINE TO MACHINE MESSAGING MECHANISM USING WSN FOR FAULT TOLERANT OPERATIONS**" is the Bonafide work"**PONBHARATHI.V (920818106020),PUGALARASU.S(920818106022),SATHISHKUMAR.G(920818106028)**" who carried out the project work under my supervision.
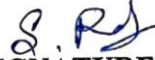
SIGNATURE

Dr. S. PONMALAR M.E., Ph.D.,

HEAD OF THE DEPARTMENT

Professor,

Department of Electronics and

Communication Engineering,

NPR College of Engineering

and Technology, Natham,

Dindigul-624 401.

SIGNATURE

Ms. S. PRIYADHARSINI M.E.,

SUPERVISOR

Assistant professor,

Department of Electronics and

Communication Engineering,

NPR College of Engineering

and Technology, Natham,

Dindigul-624 401.

Submitted for the project viva-voce examination held at NPR College of Engineering and Technology in Natham on_____.

INTERNAL EXAMINER

EXTERNAL EXAMINER

Dr. J.SUNDARARAJAN,
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ABSTRACT

Machine-to-machine (M2M) communication is a key enabling technology for the future industrial Internet of Things applications. It plays an important role in the connectivity and integration of computerized machines, such as sensors, actuators, controllers, and robots. The requirements in flexibility, efficiency, and crossplatform compatibility of the intermodule communication between the connected machines raise challenges for the M2M messaging mechanism toward ubiquitous data access and events notification. This investigation determines the challenges facing the M2M communication of industrial systems and presents a data-oriented M2M messaging mechanism based on zigbee communication . In this project , M2M communication based fault tolerant working of machines are proposed . The proposed system includes temperature and vibration sensors with overload indicator for fault tolerant operations. The evaluation is carried out through qualitative analysis and experimental studies, and the results demonstrate the feasibility of the proposed messaging mechanism. Due to the flexibility in dealing with hierarchical system architecture and cross-platform heterogeneity of industrial applications, this messaging mechanism deserves extensive investigations and further evaluations.

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CHAPTER 6

CONCLUSION AND FUTURE WORK

The number of interconnected machines will very soon exceed the overall population count. Therefore, it is of vital importance to be able to understand Machine-to-Machine (M2M) interactions. In this project we focus on giving a short overview of M2M communication principles and basic architecture. Furthermore, we present efforts of different standardisation bodies and their recommendations concerning open issues in the M2M field. Additionally, we bring forward an introduction to Ericsson's 50 Billion Connected Devices strategy, as well as provide a brief description of M2M based solutions from various leading telecommunications industry participants such as Ericsson, Nokia, Siemens and Motorola.

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EC8392OBJEC	DIGITALELECTRONICS	L	T	P	C
		3	0	0	3

TIVES:

- TopresenttheDigitalfundamentals,Booleanalgebraanditsapplicationsindigitalsystems
- Tofamiliarize withthedesignofvariouscombinationaldigitalcircuitsusinglogicgates
- Tointroducetheanalysisanddesignproceduresforsynchronousandasynchronoussequenti alcircuits
- Toexplainthevarioussemiconductormemoriesandrelatedtechnology
- To introducetheelectroniccircuitsinvolved inthemakingof logicgates

UNITI   DIGITAL FUNDAMENTALS   9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universalgates,Sumofproductsandproductofsums,MintermsandMaxterms,KarnaughmapMinimi zationandQuine-McCluskey methodofminimization.

UNITII   COMBINATIONAL CIRCUITDESIGN   9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry lookaheadAdder,BCDAdder,Multiplexer,Demultiplexer,MagnitudeComparator,Decoder,Encode r,PriorityEncoder.

UNITIII   SYNCHRONOUSSEQUENTIALCIRCUITS   9

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF,Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, stateminimization, state assignment, circuit implementation – Design of Counters- Ripple Counters,RingCounters,Shiftregisters,UniversalShiftRegister.

UNITIV   ASYNCHRONOUSSEQUENTIALCIRCUITS   9

Stable and Unstable states, output specifications, cycles and races, state reduction, race freeassignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazardfreecircuits.

UNITV   MEMORYDEVICESANDDIGITALINTEGRATEDCIRCUITS   9

Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static anddynamicRAM-ProgrammableLogicDevices–ProgrammableLogicArray(PLA)-Programmable Array   Logic   (PAL)   –   Field   Programmable   Gate   Arrays   (FPGA)   - ImplementationofcombinationallogiccircuitsusingPLA,PAL.

Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in,noisemargin,logicfamiliesandtheircharacteristics-RTL,TTL,ECL,CMOS

                                                    TOTAL: 45 PERIODS

OUTCOMES:

Attheendofthecourse:

- Usedigitalelectronicsin thepresentcontemporaryworld
- Designvariouscombinationaldigitalcircuitsusinglogicgates
- Dotheanalysisanddesignproceduresforsynchronousandasynchronoussequentialcircuits
- Use the semiconductormemoriesandrelatedtechnology
- Use electroniccircuitsinvolvedinthe designoflogicgates

TEXTBOOK:

1.   M.MorrisManoand MichaelD.Ciletti,"DigitalDesign",5th Edition,Pearson,2014.

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REFERENCES:

1. CharlesH.Roth."FundamentalsofLogicDesign",6thEdition,ThomsonLearning,2013.
2. ThomasL.Floyd,"DigitalFundamentals",10th Edition,PearsonEducationInc,2011
3. S.SalivahananandS.Arivazhagan"DigitalElectronics",IstEdition,VikasPublishingHousepvt Ltd,2012.
4. AnilK.Maini"DigitalElectronics",Wiley,2014.
5. A.AnandKumar"FundamentalsofDigitalCircuits",4thEdition,PHILearningPrivateLimited,20 16.
6. SoumitraKumarMandal"DigitalElectronics",McGrawHillEducationPrivateLimited,2016.

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Vi Micrc systems Pvt. Ltd.,

Plot No.75, El ctronics Estate, Perungudi, Chennai - 600096.
Tel : 044-2496 1842, 2496 1852
E-mail : sales@vimicrosystems.com Website : www.vimicrosystems.com
GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date: 24.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Sharmila Devi G** (920819106057) studying in Third   year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 16 days from 09.08.21 to 24.08.21.

During the period, her conduct was found to be good.

With Regards

For VI Microsystems

Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

MFRS MICROPROCESSOR TRAINERS, PROCESS CONTROL TRAINERS, POWER ELECTRONICS TRAINERS, DSP TRAINERS, PERSONAL COMPUTER T

Vi Microsystems Pvt. Ltd.,

Date: 15.03.2022

TO WHOM IT MAY CONCERN
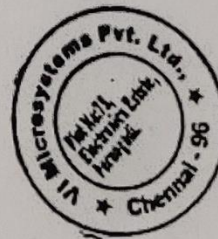
This is to certify that **Ms. Shiny Reshma J** (920819106058) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 15 days from 24.02.22 to 10.03.22.

During the period, her conduct was found to be good.

With Regards

For VI Microsystems

Principal
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EC8391   CONTROL SYSTEMS ENGINEERING   L   T   P   C
                                                                  3   0   0   3

OBJECTIVES:
- To introduce the components and their representation of control systems
- To learn various methods for analyzing the time response, frequency response and stability of the systems.
- To learn the various approach for the state variable analysis.

UNIT I   SYSTEMS COMPONENTS AND THEIR REPRESENTATION   9
Control System: Terminology and Basic Structure-Feed forward and Feedback control theory-Electrical and Mechanical Transfer Function Models-Block diagram Models-Signal flow graphs models-DC and AC servo Systems-Synchronous-Multivariable control system

UNIT II   TIME RESPONSE ANALYSIS   9
Transient response-steady state response-Measures of performance of the standard first order and second order system-effect on an additional zero and an additional pole-steady error constant and system-type number-PID control-Analytical design for PD, PI, PID control systems

UNIT III   FREQUENCY RESPONSE AND SYSTEM ANALYSIS   9
Closed loop frequency response-Performance specification in frequency domain-Frequency response of standard second order system-Bode Plot -Polar Plot-Nyquist plots-Design of compensators using Bode plots-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation

UNIT IV   CONCEPTS OF STABILITY ANALYSIS   9
Concept of stability-Bounded - Input Bounded - Output stability-Routh stability criterion-Relative stability-Root locus concept-Guidelines for sketching root locus-Nyquist stability criterion.

UNIT V   CONTROL SYSTEM ANALYSIS USING STATE VARIABLE METHODS   9
State variable representation-Conversion of state variable models to transfer functions-Conversion of transfer functions to state variable models-Solution of state equations-Concepts of Controllability and Observability-Stability of linear systems-Equivalence between transfer function and state variable representations-State variable analysis of digital control system-Digital control design using state feedback.

                                                     TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Identify the various control system components and their representations.
- Analyze the various time domain parameters.
- Analysis the various frequency response plots and its system.
- Apply the concepts of various system stability criterions.
- Design various transfer functions of digital control system using state variable models.

TEXTBOOK:
   1. M.Gopal,"Control System–Principles and Design",Tata McGraw Hill,4th Edition,2012.

REFERENCES:
   1. J.Nagrath and M.Gopal,"Control System Engineering",New Age International Publishers,5th Edition,2007.
   2. K.Ogata,'Modern Control Engineering',5th edition,PHI,2012.
   3. S.K.Bhattacharya,Control System Engineering,3rd Edition,Pearson,2013.
   4. Benjamin.C.Kuo,"Automatic control systems",Prentice Hall of India,7th Edition,1995.

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BRIGHT
TECHNOLOGY
(Institute for technical traning)

Cell : 9655913231 , 9566913231
Mall : thebrighttechnology@gmall.com

Date : 10.03.2022
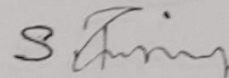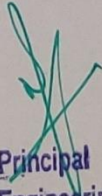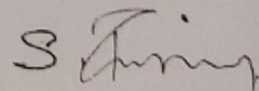
To whomsoever it may concern

This is to certify that **Mr. S.Balasakthi (920820106008)**, Second year ECE of NPR College of Engineering and Technology , Natham has undergone In-Plant training in our organization from **03.03.2022 – 10.03.2022**

We Appreciate his participation with interest towards the training program

Principal
N.P.R. College of Engineering & Technology
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S

Sri Varadharaja Bavanam,Canara Bank Upstairs,
Nagal Nagar, R.S. Road, Dindigul - 624003

Date : 10.03.2022

To whomsoever it may concern

This is to certify that **Mr. K.Ariharan (920820106007)**, Second year ECE of NPR College of Engineering and Technology , Natham has undergone In-Plant training in our organization from **03.03.2022 – 10.03.2022**

We Appreciate his participation with interest towards the training program

Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

S

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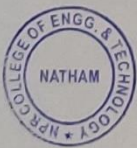
L	T	P	C
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OBJECTIVES:

- Togiveacomprehensiveexposuretoalltypesofamplifiersandoscillatorsconstructed with discrete components. This helps to develop a strong basis forbuildinglinearanddigitalintegratedcircuits
- Tostudyaboutfeedbackamplifiersandoscillatorsprinciples
- To designoscillators.
- To studyabout turnedamplifier.
- TounderstandtheanalysisanddesignofLCandRCoscillators,amplifiers,multivibrators, poweramplifiersandDCconvertors.

UNITI   FEEDBACKAMPLIFIERSANDSTABILITY   9

Feedback Concepts – gain with feedback – effect of feedback on gain stability, distortion,bandwidth, input and output impedances; topologies of feedback amplifiers – analysis ofseries-series, shunt-shunt and shunt-series feedback amplifiers-stability problem-Gain andPhase-margins-Frequency compensation.

UNITII   OSCILLATORS   9

Barkhausencriterionforoscillation–phaseshift,Wienbridge-Hartley&Colpitt'soscillators – Clapp oscillator-Ring oscillators and crystal oscillators – oscillator amplitudestabilization.

UNITIII   TUNEDAMPLIFIERS   9

Coil losses,unloadedandloadedQoftankcircuits,small signal tunedamplifiers–Analysis of capacitor coupled single tuned amplifier – double tuned amplifier - effect ofcascadingsingletunedanddoubletunedamplifiersonbandwidth–Staggertunedamplifiers-Stabilityoftunedamplifiers–Neutralization-Hazeltineneutralization method.

UNITIV   WAVESHAPINGANDMULTIVIBRATORCIRCUITS   9

Pulsecircuits– attenuators –RC integrator and differentiator circuits–diodeclampersandclippers–Multivibrators-SchmittTrigger-UJTOscillator.

UNITV   POWER AMPLIFIERSAND DC CONVERTERS   9

Poweramplifiers-classA-ClassB-ClassAB-ClassC-PowerMOSFET-TemperatureEffect-Class AB Power amplifier using MOSFET –DC/DC convertors – Buck, Boost,Buck-Boostanalysisanddesign

TOTAL: 45   PERIODS

OUTCOMES:

Uponcompletionofthe course,the studentshouldbe ableto:

- Analyzedifferent typesofamplifier,oscillatorandmultivibratorcircuits
- DesignBJTamplifierandoscillatorcircuits
- Analyzetransistorized amplifierandoscillatorcircuits
- Designandanalyzefeedbackamplifiers
- DesignLCandRCoscillators,tunedamplifiers,waveshapingcircuits,multivibrators,poweramplifierandDCconvertors.

TEXT BOOKS:

1. Sedra and Smith, "Micro Electronic Circuits"; Sixth Edition, Oxford University Press,2011.(UNIT I,III,IV,V)
2. JacobMillman,'Microelectronics',McGrawHill,2ndEdition,Reprinted,2009.(UNITI,II,IV,V)

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REFERENCES:

1. RobertL.BoylestadandLouisNasheresky,"ElectronicDevicesandCircuitTheory",10th Edition,PearsonEducation/PHI,2008
2. DavidA.Bell,"ElectronicDevicesandCircuits",FifthEdition,OxfordUniversityPress, 2008.
3. MillmanJ.andTaubH., "PulseDigitalandSwitchingWaveforms", TMH,2000.
4. MillmanandHalkias.C.,IntegratedElectronics,TMH,2007.

Dr. J.SUNDARARAJAN,
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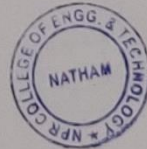Natham, Dindigul (Dt) - 624 401.

Megatronics

Date: 10.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. SANDHIYA.D (920820106034)** doing Second year B.E, Electronics and Communication Engineering in NPR College of Engineering & Technology, Natham has undergone the In-plant training program offered by our organization during the period of 03.03.22 – 10.03.22

We wish her every success in life.

For **Megatronics**

(C.Kannan)

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. GAYATHRI.M (920820106303)** doing Second year B.E, Electronics and Communication Engineering in NPR College of Engineering & Technology, Natham has undergone the In-plant training program offered by our organization during the period of 03.03.22 – 10.03.22

We wish her every success in life.

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EC8491   **COMMUNICATIONTHEORY** | L | T | P | C |
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OBJECTIVES:
- Tointroducetheconceptsofvariousanalogmodulationsandtheirspectralcharacteristics
- To understandthepropertiesofrandomprocess
- Toknowtheeffectofnoiseon communication systems
- Toknowtheprinciplesofsampling&quantization

UNITI   AMPLITUDEMODULATION   9

Amplitude Modulation- DSBSC, DSBFC, SSB, VSB - Modulation index, Spectra, Power relationsand Bandwidth – AM Generation – Square law and Switching modulator, DSBSC Generation –Balanced and Ring Modulator, SSB Generation – Filter, Phase Shift and Third Methods, VSBGeneration – Filter Method, Hilbert Transform, Pre-envelope & complex envelope – comparison ofdifferentAMtechniques,SuperheterodyneReceiver

UNITII   ANGLEMODULATION   9

Phase and frequency modulation, Narrow Band and Wide band FM – Modulation index, Spectra,Power relations and Transmission Bandwidth - FM modulation –Direct and Indirect methods, FMDemodulation–FMtoAMconversion,FMDiscriminator-PLLasFMDemodulator.

UNITIII   RANDOMPROCESS   9

Randomvariables,RandomProcess,StationaryProcesses,Mean, Correlation&Covariancefunctions, Power Spectral Density, Ergodic Processes, GaussianProcess, Transmission ofaRandomProcessThroughaLTIfilter.

UNITIV   NOISECHARACTERIZATION   9

Noisesources –Noise figure, noisetemperatureandnoisebandwidth–Noiseincascadedsystems. Representation of Narrow band noise –In-phase and quadrature, Envelope and Phase –Noise performance analysis in AM & FM systems – Threshold effect, Pre-emphasis and de-emphasisforFM.

UNITV   SAMPLING& QUANTIZATION   9

Lowpasssampling–Aliasing-SignalReconstruction-Quantization-Uniform&non-uniformquantization - quantization noise - Logarithmic Companding –PAM, PPM, PWM, PCM – TDM,FDM.

                                         TOTAL: 45   PERIODS

OUTCOMES:
Atthe endofthecourse,thestudentshouldbe able to:
- DesignAMcommunicationsystems
- DesignAnglemodulated communicationsystems
- ApplytheconceptsofRandomProcessto thedesignofCommunication systems
- AnalyzethenoiseperformanceofAMandFMsystems
- Gainknowledgein samplingand quantization

TEXT BOOKS:
1. J.G.Proakis,M.Salehi,"Fundamentals ofCommunicationSystems",PearsonEducation2014.(UNIT I-IV)
2. Simon Haykin, "CommunicationSystems",4thEdition,Wiley,2014.(UNITI-V)

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REFERENCES:

1. B.P.Lathi,"ModernDigitalandAnalogCommunicationSystems",3rdEdition,OxfordUniversityPress,2007.

2. D.Roody,J.Coolen,—ElectronicCommunications,4theditionPHI2006

3. A.Papoulis,"Probability,RandomvariablesandStochasticProcesses",McGrawHill,3rdedition,1991.

4. B.Sklar,"DigitalCommunicationsFundamentalsandApplications",2ndEditionPearsonEducation2007

5. HP Hsu, SchaumOutlineSeries-"AnalogandDigitalCommunications"TMH2006

6. Couch.L.,"ModernCommunicationSystems",Pearson,2001.

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ELYSIUM TECHNOLOGIES
PRIVATE LIMITED

GST No: 33AACCE2334E1ZA
CIN No: U72200TN2006PTC060465

NASSCOM MEMBER

Date: 15.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the students of third year ECE of NPR College of Engineering & Technology, Natham have successfully done the Internship training in our concern from 21.02.22 to 07.03.2022

During this period they were sincere and hardworking.

S.No.	Name of the student	Register Number	Year& Branch
1.	Ajith Kumar .K	920819106008	III ECE
2.	Asma Roshan. T	920819106007	III ECE
3.	Jyothika .B	920819106021	III ECE
4.	Kamalesh.K	920819106022	III ECE
5.	Keerthi.M	920819106024	III ECE

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With Regards

(For Elysium technologies)

OBJECTIVES:

- To gain conceptual and basic mathematical understanding of electric and magnetic fields infreespaceandinmaterials
- To understand the coupling between electric and magnetic fields through Faraday's law,displacementcurrentandMaxwell's equations
- To understandwavepropagation in losslessand in lossymedia
- Tobeabletosolveproblems basedontheaboveconcepts

UNITI   INTRODUCTION   12

Electromagnetic model, Units and constants, Review ofvector algebra, Rectangular, cylindricaland spherical coordinate systems, Line, surface and volume integrals, Gradient of a scalar field,Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem, Nullidentities,Helmholtz'stheorem

UNITII   ELECTROSTATICS   12

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in staticelectricfield,Dielectricsinstaticelectricfield,Electricfluxdensityanddielectricconstant,Boundaryco nditions,Capacitance,Parallel,cylindricalandsphericalcapacitors,Electrostaticenergy, Poisson's and Laplace's equations, Uniqueness of electrostatic solutions, Current densityandOhm'slaw,ElectromotiveforceandKirchhoff'svoltagelaw,EquationofcontinuityandKirchhoff 'scurrentlaw

UNITIII   MAGNETOSTATICS   12

Lorentz force equation, Law pf no magnetic monopoles, Ampere's law, Vector magnetic potential,Biot-
Savartlawandapplications,Magneticfieldintensityandideaofrelativepermeability,Magneticcircuits,Be haviourofmagneticmaterials,Boundaryconditions,Inductanceandinductors,Magneticenergy,Magneti cforcesandtorques

UNITIV   TIME-VARYINGFIELDSANDMAXWELL'sEQUATIONS   12

Faraday's law, Displacement current and Maxwell-Ampere law, Maxwell's equations, Potentialfunctions, Electromagnetic boundary conditions, Wave equations and solutions, Time-harmonicfields

UNITV   PLANEELECTROMAGNETIC WAVES   12

Planewavesinlosslessmedia,Planewavesinlossymedia(low-lossdielectricsandgoodconductors), Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence ataplaneconductingboundary,Normalincidenceataplanedielectric boundary

                                            TOTAL:60PERIODS

OUTCOMES:

Bytheendofthiscourse, thestudentshouldbe able to:

- Displayanunderstandingof fundamentalelectromagneticlawsandconcepts
- WriteMaxwell's
  equationsinintegral,differentialandphasorformsandexplaintheirphysicalmeaning
- Explainelectromagneticwavepropagationinlossyandinlosslessmedia
- Solve
  simpleproblemsrequiringestimationofelectricandmagneticfieldquantitiesbasedontheseconcept sandlaws

TEXT BOOKS:

1. D.K.Cheng,Fieldandwave electromagnetics, 2nded., Pearson(India),1989(UNITI,II,IIIIV,V)
2. W.H.HaytandJ.A.Buck,Engineeringelectrmagnetics,7thed.,McGraw-Hill(India),2006(UNITI- V)

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REFERENCES

1. D.J.Griffiths,Introductiontoelectrodynamics,4thed.,Pearson (India),2013
2. B.M.Notaros,Electromagnetics,Pearson:NewJersey,2011
3. M.N.O.SadikuandS.V.Kulkarni,Principlesofelectromagnetics,6thed.,Oxford(AsianEdition),2015

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AN DEEP LEARNING MODEL FOR BRAIN TUMOR SEGEMENTATION AND CLASSIFICATION

A PROJECT REPORT

Submitted by

ABILASHA. M	**(920818106001)**
ILAKKIYA. B	**(920818106010)**
SOWMIYA. P	**(920818106031)**

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

In

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY

NATHAM, DINDIGUL

ANNA UNIVERSITY::CHENNAI 600 025

JUNE 2022

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ANNA UNIVERSITY::CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "AN DEEP LEARNING MODEL FOR BRAIN TUMOR SEGMENTATION AND CLASSIFICATION" is the bonafide work of, "ABILASHA.M (920818106001), ILAKKIYA.B (920818106010), SOWMIYA.P (920818106031)" who carried out the project work under my supervision.

SIGNATURE

Dr.S.PONMALAR M.E.,Ph.D.,

HEAD OF THE DEPARTMENT

Professor, Department of

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NPR College of Engineering and

Technology, Natham,

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SIGNATURE

Mr.K.JAYAPRAKASAM M.E.,

SUPERVISOR

Assistant Professor, Department of

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NPR College of Engineering and

Technology, Natham,

Dindigul -624 401.

Submitted for the project viva-voice examination held at NPR College of Engineering and Technology in Natham on 24-06-2022.

INTERNAL EXAMINER   EXTERNAL EXAMINER

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ABSTRACT

A brain tumor is a portion of uneven cells, need to be detected earlier for treatment. Magnetic Resonance Imaging (MRI) is a routinely utilized procedure to take brain tumor images. Manual segmentation of tumor is a crucial task and laborious. There is a need for an automated system for segmentation and classification for tumor surgery and medical treatments. This work suggests an efficient brain tumor segmentation and classification based on deep learning techniques. Initially, bidirectional ConvLSTM U-net with attention gate proposed for brain tumour segmentation. Then, Deep ResNet and Inception Model used for classification. In addition, bidirectional attention modules of position and channel modules were added in U-Net to extract more characteristic features. Implementation results on BraTS 2018 datasets show that proposed segmentation and classification outperforms in terms of accuracy, dice score, precision rate, recall rate, and Hausdorff Distance.

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EC8453   LINEARINTEGRATEDCIRCUITS   LTP C
       300 3

OBJECTIVES:
- To introducethebasicbuildingblocksoflinearintegrated circuits
- To learnthelinearandnon-linearapplicationsof operationalamplifiers
- To introducethetheoryandapplicationsof analogmultipliersandPLL
- TolearnthetheoryofADCandDAC
- TointroducetheconceptsofwaveformgenerationandintroducesomespecialfunctionICs

UNITI   BASICSOFOPERATIONALAMPLIFIERS   9

Current mirror and current sources, Current sources as active loads, Voltage sources, VoltageReferences, BJT Differential amplifier with active loads, Basic information about op-amps – IdealOperational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC741, DC and AC performance characteristics, slew rate, Open and closed loop configurations – JFETOperationalAmplifiers–LF155andTL082.

UNITII   APPLICATIONSOF OPERATIONALAMPLIFIERS   9

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters,adder,subtractor,Instrumentationamplifier,Integrator,Differentiator,Logarithmicamplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipperandclamper,Low-pass,high-passandband-passButterworthfilters.

UNITIII   ANALOGMULTIPLIERAND PLL   9

AnalogMultiplierusingEmitterCoupledTransistorPair-GilbertMultipliercell–
Variabletransconductance technique, analog multiplier ICs and their applications, Operation of the basicPLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLLfor AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizingandclocksynchronisation.

UNITIV   ANALOGTODIGITALANDDIGITAL TOANALOG   9
              CONVERTERS

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2RLadder type, Voltage Mode and Current-Mode R - 2R Ladder types - switches for D/A converters,high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - SuccessiveApproximation type - Single Slope type – Dual Slope type - A/D Converter using Voltage-to-TimeConversion-Over-samplingA/DConverters,Sigma–Deltaconverters.

UNITV   WAVEFORMGENERATORSANDSPECIALFUNCTIONICS   9

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator,ICL8038 function generator, Timer IC 555, IC Voltageregulators – Three terminal fixed andadjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator,Low Drop – Out(LDO) Regulators - Switched capacitor filter IC MF10, Frequency to Voltage andVoltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplersandfibreopticIC.

            TOTAL:45PERIODS

OUTCOMES:
Uponcompletionofthe course,the studentshouldbe ableto:
- Designlinearandnonlinearapplicationsof OP–AMPS
- Designapplicationsusinganalog multiplierandPLL
- DesignADCandDACusingOP–AMPS
- Generate waveformsusingOP–AMP Circuits
- Analyze specialfunctionICs

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19

TEXT BOOKS:
1. D.RoyChoudhry,Shail Jain,"Linear Integrated Circuits",New AgeInternationalPvt.Ltd.,2018,FifthEdition.(UnitI–V)
2. SergioFranco,"DesignwithOperationalAmplifiersandAnalogIntegratedCircuits",4thEdition,TataMcGraw-Hill,2016(UnitI–V)

REFERENCES:
1. RamakantA.Gayakwad,"OP-AMPandLinearICs",4thEdition,PrenticeHall/PearsonEducation,2015.
2. RobertF.Coughlin,FrederickF.Driscoll,"OperationalAmplifiersandLinearIntegratedCircuits",SixthEdition,PHI,2001.
3. B.S.Sonde,"Systemdesign usingIntegratedCircuits",2ndEdition, NewAgePub,2001.
4. Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", WileyInternational,5[th]Edition,2009.
5. WilliamD.Stanley,"OperationalAmplifierswithLinearIntegratedCircuits",PearsonEducation,4th Edition,2001.
6. S.Salivahanan&V.S.KanchanaBhaskaran,"LinearIntegratedCircuits",TMH,2[nd]Edition,4[th]Reprint,2016.

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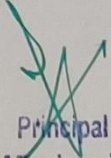
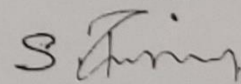Date : 10.03.2022

To whomsoever it may concern

This is to certify that **Mr. M.Vasanthakumar (920820106046)**, Second year ECE of NPR College of Engineering and Technology , Natham has undergone In-Plant training in our organization from **03.03.2022 – 10.03.2022**

We Appreciate his participation with interest towards the training program

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Date : 10.03.2022

To whomsoever it may concern

This is to certify that **Mr. T.Sabeer Ahamed (920820106032)**, Second year ECE of NPR College of Engineering and Technology , Natham has undergone In-Plant training in our organization from **03.03.2022 – 10.03.2022**

We Appreciate his participation with interest towards the training program

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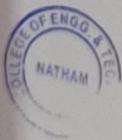
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EC8501   DIGITALCOMMUNICATION   L T P C
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OBJECTIVES:

- To studythe limitssetbyInformation Theory
- Tostudythevariouswaveformcodingschemes
- Tolearn thevariousbaseband transmissionschemes
- To understandthevariousbandpasssignalingschemes
- Toknowthefundamentalsof channelcoding

UNITI   INFORMATIONTHEORY   9

Discrete Memoryless source, Information, Entropy, Mutual Information - Discrete Memorylesschannels – Binary Symmetric Channel, Channel Capacity - Hartley - Shannon law - Source codingtheorem-Shannon-Fano&Huffmancodes.

UNITII   WAVEFORMCODING&REPRESENTATION   9

Prediction filtering and DPCM - Delta Modulation - ADPCM & ADM principles-Linear PredictiveCoding- Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ – BipolarNRZ-Manchester

UNITIII   BASEBANDTRANSMISSION&RECEPTION   9

ISI – Nyquist criterion for distortion less transmission – Pulse shaping – Correlative coding - Eyepattern–ReceivingFilters-MatchedFilter, Correlationreceiver,AdaptiveEqualization

UNITIV   DIGITALMODULATIONSCHEME   9

Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK,BFSK & QPSK - QAM - Carrier Synchronization - Structure of Non-coherent Receivers - PrincipleofDPSK.

UNITV   ERRORCONTROL CODING   9

Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutionalcodes -Viterbi Decoder.

                                              TOTAL:45PERIODS

OUTCOMES:

Uponcompletionofthecourse,thestudentshouldbeable to

- DesignPCMsystems
- Designandimplementbasebandtransmissionschemes
- Designandimplementbandpasssignalingschemes
- Analyzethespectralcharacteristicsofbandpasssignalingschemesandtheirnoiseperformance
- Designerrorcontrolcodingschemes

TEXTBOOK:

1.S. Haykin,"DigitalCommunications",JohnWiley,2005(UnitI–V)

REFERENCES

1. B.Sklar,"DigitalCommunicationFundamentalsandApplications",2ndEdition,PearsonEducation,2009
2. B.P.Lathi,"ModernDigitalandAnalogCommunicationSystems" 3rdEdition,OxfordUniversityPress2007.
3. HP Hsu, SchaumOutlineSeries-"AnalogandDigitalCommunications", TMH2006
4. J.GProakis,"DigitalCommunication",4thEdition,TataMcGrawHillCompany,2001.

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Date: 26.08.2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the students of Third year ECE of NPR College of Engineering & Technology, Natham have successfully done the Internship in our concern from 11.08.21 to 26.08.2021.

During this period they were sincere and hardworking.

S.No.	Name of the student	Register Number	Year& Branch
1.	Mohan Babu B	920819106034	III ECE
2.	Muthu Moorthy M	920819106036	III ECE
3.	Prasanna D	920819106046	III ECE
4.	Singarabrindha N	920819106059	III ECE
5.	Vishali K	920819106069	III ECE

With Regards

(For Elysium Technologies)

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DISCRETE-TIMESIGNALPROCESSING   **L T P   C**

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OBJECTIVES:

- To learndiscretefouriertransform,propertiesof DFTanditsapplicationtolinearfiltering
- Tounderstandthecharacteristicsofdigitalfilters,designdigitalIIRandFIRfiltersandapply thesefilters tofilterundesirablesignals invariousfrequencybands
- Tounderstandtheeffectsoffiniteprecisionrepresentationondigitalfilters
- Tounderstandthefundamentalconceptsofmultiratesignalprocessinganditsapplications
- Tointroducetheconceptsofadaptivefiltersanditsapplicationtocommunicationengineering

UNITI   DISCRETEFOURIER TRANSFORM   12

Review ofsignals andsystems, concept of frequency in discrete-timesignals, summary ofanalysis & synthesis equations for FT & DTFT, frequency domain sampling, Discrete Fouriertransform (DFT) - deriving DFT from DTFT, properties of DFT - periodicity, symmetry, circularconvolution. Linear filtering using DFT. Filtering long data sequences - overlap save and overlapadd method. Fast computation of DFT - Radix-2 Decimation-in-time (DIT) Fast Fourier transform(FFT), Decimation-in-frequency(DIF)FastFouriertransform(FFT).LinearfilteringusingFFT.

UNITII   INFINITEIMPULSERESPONSEFILTERS   12

Characteristics of practical frequency selective filters.characteristics of commonly used analogfilters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF,BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation.Frequency transformation in the analog domain.Structure of IIR filter - direct form I, direct form II,Cascade,parallel realizations.

UNITIII   FINITEIMPULSERESPONSEFILTERS   12

Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filtersusing Fourier series method - FIR filter design usingwindows (Rectangular, Hamming andHanning window), Frequency sampling method.FIR filter structures - linear phase structure,directformrealizations

UNITIV   FINITEWORD LENGTHEFFECTS   12

Fixed point and floating point number representation- ADC - quantization - truncation androunding - quantization noise - input / output quantization - coefficient quantization error - productquantizationerror - overflow error - limit cycle oscillations duetoproduct quantizationandsummation-scalingtopreventoverflow.

UNITV   INTRODUCTIONTODIGITAL SIGNAL PROCESSORS   12

DSP functionalities -circular buffering – DSP architecture – Fixed and Floating point architectureprinciples–Programming–Applicationexamples.

                                                          TOTAL:60PERIODS

OUTCOMES:
Attheendofthecourse, thestudentshouldbeable to

- ApplyDFTfortheanalysis ofdigitalsignalsandsystems
- DesignIIR andFIRfilters
- Characterizetheeffectsoffiniteprecisionrepresentationondigitalfilters
- Designmultiratefilters
- Applyadaptivefiltersappropriatelyincommunicationsystems

TEXTBOOK:
1. JohnG.Proakis&DimitrisG.Manolakis,"DigitalSignalProcessing–
   Principles,Algorithms&Applications",Fourth   Edition, PearsonEducation/
   PrenticeHall,2007.(UNITI–V)

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REFERENCES:

1. EmmanuelC.Ifeachor&Barrie.W.Jervis,"DigitalSignalProcessing",SecondEdition,PearsonEducation/PrenticeHall,2002.
2. A.V.Oppenheim,R.W.SchaferandJ.R.Buck,"Discrete-TimeSignalProcessing",8thIndianReprint,Pearson,2004.
3. SanjitK. Mitra,"DigitalSignalProcessing –AComputerBased Approach", TataMcGrawHill,2007.
4. AndreasAntoniou,"DigitalSignalProcessing",TataMcGrawHill,2006.

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MACHINE LEARNING MODEL FOR FATIGUE LEVEL DETECTION

A PROJECT REPORT

Submitted by

JAYA PRATHAP.S	**(920818106011)**
JEYARAJ.S	**(920818106012)**
RAJKUMAR.K	**(920818106024)**

in partial fulfillment for the award of the

degree of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY

NATHAM, DINDIGUL.

i

Dr. J.SUNDARARAJAN,
B.E., M.Tech., Ph.D.,
Principal
N.P.R. College of Engineering & Technology
Natham, Dindigul (Dt) - 624 401.

ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"Machine learning model for Fatigue Level Detection"** is the Bonafide work of **"JAYA PRATHAP.S (920818106011), JEYARAJ.S(920818106012), RAJKUMAR.K (920818106024)"** who carried out the project work under my supervision.

SIGNATURE

Dr. S. PONMALAR , M.E., Ph.D.,

Professor,

HEAD OF THE DEPARTMENT

Department of Electronics and
Communication Engineering,

NPR College of Engineering

and Technology,

Natham,

Dindigul-624 401.

SIGNATURE 23/6/22

Dr. M. AMEENA BANU

M.E., Ph.D.,

Associate Professor,

Department of Electronics and
Communication Engineering,

NPR College of Engineering

and Technology,

Natham,

Dindigul-624 401.

Submitted for the project viva-voce examination held at NPR College of Engineering and Technology in Natham on_____.

INTERNAL EXAMINER

EXTERNAL EXAMINER

Dr. J.SUNDARARAJAN,
ii B.E., M.Tech., Ph.D.,
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ABSTRACT

Vehicle accidents are most common if the driving is inadequate. It happens on most factors if the driver is drowsy or if he is alcoholic. Driver drowsiness is recognized as an important factor in the vehicle accidents. It was demonstrated that driving performance deteriorates with increased drowsiness with resulting crashes constituting more than 30% of all vehicle accidents. But the life lost once cannot be re-winded. Advanced technology offers some hope to avoid these up to some extent. This project involves measure and control of the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays from the eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This will help to know whether the eye is in closing or opening position. The output is given to logic circuit to indicate the alarm. This project involves controlling accident due to unconscious through eye blink. Here one eye blink sensor is fixed in vehicle where if anybody looses conscious and indicate through alarm. Further, pulse rate sensor is included with GSM for monitoring the health status of the drivers.

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x

Chapter 6

CONCLUSION

Our project Accident Prevention by Eye Blinking Sensor was implemented successfully. The sensor values are processed using ANN. This device provides much advanced facilities in now a days life as it can be easily implemented in vehicles. Thus we can reduce a drowsy related road accidents and hence these kinds of detectors have a great relevance. It can also be used in schools, colleges, offices and some public places such as hospitals, libraries etc.Through this project we present hardware programming of microcontroller to facilitate as eye blinking sensor.

EC8552   COMPUTERARCHITECTUREANDORGANIZATION   **LTPC**
                                                                               3   0 03

OBJECTIVES:
- Tomake studentsunderstand thebasicstructureandoperation ofdigitalcomputer
- Tofamiliarize withimplementationoffixedpointandfloating-pointarithmeticoperations
- Tostudythedesignofdatapathunitandcontrolunitforprocessor
- Tounderstandtheconceptofvariousmemoriesand interfacing
- Tointroducetheparallelprocessingtechnique

UNITI   COMPUTERORGANIZATION&INSTRUCTIONS   9

Basicsofacomputersystem:Evolution,Ideas,Technology,Performance,Powerwall,UniprocessorstoMultiprocessors.   Addressingand   addressingmodes.Instructions: OperationsandOperands,Representinginstructions,Logicaloperations,controloperations.

UNITII   ARITHMETIC   9

FixedpointAddition,Subtraction,MultiplicationandDivision.FloatingPointarithmetic,Highperformance arithmetic,Subwordparallelism

UNITIII   THEPROCESSOR   9

Introduction, Logic Design Conventions, Building a Datapath - A Simple Implementation scheme - An Overview of Pipelining – Pipelined Datapath and Control. Data Hazards: Forwarding versusStalling,Control Hazards,Exceptions,ParallelismviaInstructions.

UNITIV   MEMORYAND I/OORGANIZATION   9

Memoryhierarchy,MemoryChipOrganization,Cachememory,Virtualmemory. Parallel Bus Architectures, Internal Communication Methodologies, Serial Bus Architectures, Massstorage,InputandOutputDevices.

UNITV   ADVANCED COMPUTERARCHITECTURE   9

Parallel processing architectures and challenges, Hardware multithreading, Multicore and sharedmemory multiprocessors, Introduction to Graphics Processing Units, Clusters and Warehousescalecomputers -IntroductiontoMultiprocessornetworktopologies.

                                                                     TOTAL:45PERIODS

OUTCOMES:
Attheendofthecourse, thestudentshouldbeable to
- Describedatarepresentation, instructionformatsandtheoperationof adigitalcomputer
- Illustratethefixedpointandfloating-pointarithmetic forALUoperation
- Discussaboutimplementation schemesofcontrolunitandpipelineperformance
- Explaintheconceptofvariousmemories,interfacingandorganizationofmultipleprocessors
- Discussparallelprocessingtechniqueandunconventionalarchitectures

TEXT BOOKS:
1. DavidA.PattersonandJohnL.Hennessey,"ComputerOrganizationandDesign",Fifthedition,MorganKauffman/Elsevier,2014.(UNIT I-V)

2. MilesJ.MurdoccaandVincentP.Heuring,"ComputerArchitectureandOrganization:AnIntegratedapproach",Secondedition,WileyIndiaPvtLtd,2015(UNITIV,V)

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REFERENCES

1. V.CarlHamacher,ZvonkoG.VaranesicandSafatG.Zaky,"ComputerOrganization", Fifthedition,McGraw-HillEducationIndiaPvtLtd,2014.

2. WilliamStallings"ComputerOrganizationandArchitecture",SeventhEdition,PearsonEducation,2006.

3. Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications",Secondedition,McGraw-Hill EducationIndiaPvtLtd,2014.

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Vi Microsystems Pvt. Ltd.,

Plot No.75, Electronics Estate, Perungudi, Chennai - 600096.
Tel : 044-2496 1842, 2496 1852
E-mail : sales@vimicrosystems.com Website : www.vimicrosystems.com
GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date: 15.03.2022

TO WHOM IT MAY CONCERN

This is to certify that **Mr. Ram Vignesh R P** (920819106048) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 15 days from 24.02.22 to 10.03.22.

During the period, his conduct was found to be good.

With Regards

For VI Microsystems

Principal
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MFRS. MICROPROCESSOR TRAINERS, PROCESS CONTROL TRAINERS, POWER ELECTRONICS TRAINERS, DSP TRAINERS, PERSONAL COMPUTER

Date: 15.03.2022

TO WHOM IT MAY CONCERN

This is to certify that **Mr. Prasanna D** (920819106046) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 15 days from 24.02.22 to 10.03.22.

During the period, his conduct was found to be good.

With Regards

For VI Microsystems

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EC8551OBJE	COMMUNICATIONNETWORKS	L	T	P	C
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CTIVES:

Thestudentshouldbemadeto:

- Understandthe divisionofnetworkfunctionalitiesintolayers.
- Befamiliarwiththecomponentsrequiredtobuilddifferenttypesof networks
- Beexposedtothe requiredfunctionalityateachlayer
- Learn theflowcontrolandcongestioncontrolalgorithms

UNITI   FUNDAMENTALS& LINKLAYER   9

Overview of Data Communications- Networks – Building Network and its types– Overview ofInternet - Protocol Layering -OSI Mode – Physical Layer – Overview of Data and Signals-introductiontoDataLinkLayer-LinklayerAddressing-ErrorDetectionandCorrection

UNITII   MEDIAACCESS& INTERNETWORKING   9

Overview of Data link Control and Media access control - Ethernet (802.3) - Wireless LANs – Available Protocols – Bluetooth – Bluetooth Low Energy – WiFi – 6LowPAN–Zigbee - Networklayerservices–PacketSwitching–IPV4 Address–Networklayerprotocols(IP,ICMP, MobileIP)

UNITIII   ROUTING   9

Routing- Unicast Routing – Algorithms – Protocols –Multicast Routing and its basics – Overviewof Intradomain and Interdomain protocols –Overview of IPv6 Addressing – Transition from IPv4 toIPv6

UNITIV   TRANSPORTLAYER   9

Introduction to Transport layer –Protocols- User Datagram Protocols (UDP) and TransmissionControl Protocols (TCP) –Services – Features – TCP Connection – State Transition Diagram –Flow, Error and Congestion Control - Congestion avoidance (DECbit, RED) – QoS – Applicationrequirements

UNITV   APPLICATIONLAYER   9

Application Layer Paradigms – Client Server Programming – World Wide Web and HTTP - DNS– Electronic Mail (SMTP, POP3, IMAP, MIME) – Introduction to Peer to Peer Networks – Need forCryptographyandNetworkSecurity –Firewalls.

                                                        TOTAL:45PERIODS

OUTCOMES:

Atthe endofthecourse,thestudentshouldbe able to:

- Identifythe componentsrequired to builddifferenttypesofnetworks
- Choosetherequiredfunctionalityateachlayerforgivenapplication
- Identifysolutionforeachfunctionalityat eachlayer
- Tracetheflowof informationfromonenodetoanothernodeinthenetwork

TEXTBOOK:

1. BehrouzA.Forouzan,"DatacommunicationandNetworking",FifthEdition,TataMcGraw–Hill,2013(UNIT I–V)

REFERENCES

1. JamesF.Kurose,KeithW.Ross,"ComputerNetworking-ATop-DownApproachFeaturingtheInternet",SeventhEdition,PearsonEducation,2016.
2. Nader.F.Mir,"ComputerandCommunicationNetworks",PearsonPrenticeHallPublishers,2ndE dition,2014.
3. Ying-DarLin,Ren-HungHwang,FredBaker,"ComputerNetworks:AnOpenSourceApproach",McGraw Hill Publisher,2011.
4. LarryL.Peterson,BruceS.Davie,"ComputerNetworks:ASystemsApproach",FifthEdition,Morg anKaufmannPublishers,2011.

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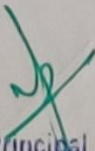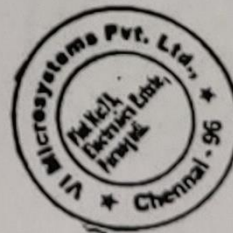
Date: 24.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Sneha P** (920819106060) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 08 days from 09.08.21 to 24.08.21.
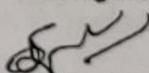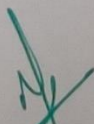
During the period, her conduct was found to be good.

With Regards

For VI Microsystems

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N.P.R. College of Engineering & Technology
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E-mail : sales@vimicrosystems.com Website : www.vimicrosystems.com
GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J
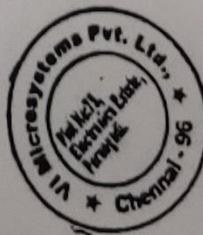
Date: 24.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Mr. Nandha kumar G** (920819106041) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 16 days from 09.08.21 to 24.08.21.

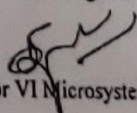During the period, his conduct was found to be good.

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MFRS MICROPROCESSOR TRAINERS, PROCESS CONTROL TRAINERS, POWER ELECTRONICS TRAINERS, DSP TRAINERS, PERSONAL COMPUTER TRAINERS

OMD551   **BASICS OF BIOMEDICAL INSTRUMENTATION**   **LTPC**
3003
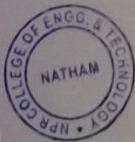
OBJECTIVES:

- To study about the different biopotential and its propagation
- To understand the different types of electrodes and its placement for various recording
- To study the design of bioamplifier for various physiological recording
- To learn the different measurement techniques for non-physiological parameters.
- To familiarize the different biochemical measurements.

CO-PO MAPPING:

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1				✓		✓					
CO2				✓		✓					
CO3	✓	✓		✓	✓	✓					
CO4				✓	✓	✓	✓				
CO5				✓	✓	✓	✓				

UNIT I   BIO POTENTIAL GENERATION AND ELECTRODES TYPES   9

Origin of bio potential and its propagation. Types of electrodes - surface, needle and micro electrodes and their equivalent circuits. Recording problems-measurement with two electrodes

UNIT II   BIO SIGNAL CHARACTERISTICS AND ELECTRODE CONFIGURATIONS   9

Biosignals characteristics – frequency and amplitude ranges. ECG – Einthoven's triangle, standard 12 lead system. EEG – 10-20 electrode system, unipolar, bipolar and average mode. EMG– unipolar and bipolar mode.

UNIT III   SIGNAL CONDITIONING CIRCUITS   9

Need for bio-amplifier - differential bio-amplifier, Impedance matching circuit, isolation amplifiers, Powerline interference, Right leg driven ECG amplifier, Band pass filtering

UNIT IV   MEASUREMENT OF NON-ELECTRICAL PARAMETERS   10

Temperature, respiration rate and pulse rate measurements. Blood Pressure: indirect methods - Auscultatory method, direct methods: electronic manometer, Systolic, diastolic pressure, Blood flow and cardiac output measurement: Indicator dilution, and dye dilution method, ultrasound blood flow measurement.

UNIT V   BIO-CHEMICAL MEASUREMENT   8

Blood gas analyzers and Non-Invasive monitoring, colorimeter, Sodium Potassium Analyser, spectrophotometer, blood cell counter, autoanalyzer (simplified schematic description).

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the students should be able to:

CO1: To Learn the different bio potential and its propagation.
CO2: To get Familiarize the different electrode placement for various physiological recording
CO3: Students will be able design bioamplifier for various physiological recording
CO4: Students will understand various technique non electrical physiological measurements

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DEEP CONVOLUTION NEURAL NETWORK ON BREAST CANCER DIAGNOSTIC METHODOLODY

A PROJECT REPORT

Submitted by

BLESSING.X	**(920818106004)**
SREE RAGA SUDHA.K	**(920818106032)**
VARSHIINI.B	**(920818106036)**

In partial fulfillment for the award of the degree

of

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in

ELECTRONICS AND COMMUNICATION ENGINEERING

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JUNE 2022

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ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"DEEP CONVOLUTION NEURAL NETWORK ON BREAST CANCER DIAGNOSTIC METHODOLOGY"** is the bonafide work of **"X.BLESSING (920818106004), K.SREERAGASUDHA(920818106032), B.VARSHIINI(920818106036)"** who carried out the project work under the supervision.

SIGNATURE

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Mrs.C.KANNIKA PARAMESHWARI

M.E.,

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Submitted for the project viva-voice examination held at NPR College of Engineering & Technology in Natham 24. 06. 2022.

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Cancer is the second death-causing disease that affects worldwide women. Breast cancer accounts for 27% of all cancers among females. Current early detection methods are expensive or computationally complex and thus unsuitable for developing countries. For this reason, a real-time fully automated Computer Aided Diagnosis system for Breast Cancer early detection from Ultrasound images is built in this project. The rapid development of Artificial Intelligence with deep learning techniques, has spurred much interest in its application to medical imaging problems. Here, we develop a deep learning algorithm that can accurately detect breast cancer on screening mammograms using an "end-to-end" training approach that efficiently leverages training datasets with either complete clinical annotation or only the cancer status (label) of the whole image. In this approach, lesion annotations are required only in the initial training stage, and subsequent stages require only image-level labels, eliminating the reliance on rarely available lesion annotations. Our all convolutional network method for classifying screening mammograms attained excellent performance in comparison with previous methods. This Project focuses on providing benefits and risks of breast multi-imaging modalities, segmentation schemes, feature extraction, classification of breast abnormalities through state-of-the-art deep learning approaches.

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CHAPTER 7
CONCLUSION & FUTUREWORK

The coverage of this research and the literature reported in this research clearly states that breast cancer is at alarming stage across the globe and in order to prevent it there is a need for some smart systems to handle the complexities associated with this disease. The findings of this study will rebound to the society considering that machine learning plays important role in disease prediction as various techniques of machine learning are helpful in; early detection, avoidance, prediction, reduction in cost, facilitating medical practitioners to make decisions on a real-time basis and diagnose the disease at an early stage. It will be helpful for the patients as well because they may be diagnosed at initial stages of chronic disease. Also, early detection and proper diagnosis can reduce the number of deaths due to chronic disease like breast cancer.

Dr. J.SUNDARARAJAN,

OBJECTIVES:

- TounderstandtheArchitectureof8086 microprocessor.
- Tolearn thedesign aspectsofI/Oand MemoryInterfacing circuits.
- Tointerfacemicroprocessorswithsupportingchips.
- TostudytheArchitectureof8051microcontroller.
- To designa microcontrollerbased system

UNITI   THE8086MICROPROCESSOR   9

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set andassembler directives – Assembly language programming – Modular Programming - Linking andRelocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte andStringManipulation.

UNITII   8086SYSTEMBUSSTRUCTURE   9

8086signals– Basicconfigurations – System bus timing –System design using 8086 – I/Oprogramming–IntroductiontoMultiprogramming–SystemBusStructure–
Multiprocessorconfigurations–Coprocessor,CloselycoupledandlooselyCoupledconfigurations–
Introductiontoadvancedprocessors.

UNITIII   I/OINTERFACING   9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communicationinterface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller –DMA controller – Programming and applications Case studies: Traffic Light control, LED display ,LCDdisplay,Keyboarddisplay interfaceandAlarmController.

UNITIV   MICROCONTROLLER   9

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instructionset-Addressingmodes -Assemblylanguageprogramming.

UNITV   INTERFACINGMICROCONTROLLER   9

Programming8051Timers-SerialPortProgramming-InterruptsProgramming–
LCD&KeyboardInterfacing-ADC,DAC&SensorInterfacing-ExternalMemoryInterface-StepperMotor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARMprocessors

TOTAL:45PERIODS

OUTCOMES:

Attheendofthe course,thestudentsshouldbeable to:

- Understandandexecuteprogramsbasedon8086microprocessor.
- DesignMemoryInterfacingcircuits.
- Designand interface I/Ocircuits.
- Designandimplement8051microcontrollerbasedsystems.

TEXT BOOKS:

1. Yu-ChengLiu,GlennA.Gibson,"MicrocomputerSystems:The8086/8088Family-Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007. (UNIT I-III)
2. Mohamed Ali Mazidi, Janice GillispieMazidi, RolinMcKinlay, "The 8051 Microcontroller andEmbedded Systems: Using Assembly and C", Second Edition, Pearson education, 2011. (UNITIV-V)

REFERENCES:

1. DoughlasV.Hall,"MicroprocessorsandInterfacing,ProgrammingandHardware",TMH,2012
2. A.K.Ray,K.M.Bhurchandi, "Advanced Microprocessors and Peripherals" 3rd edition, TataMcGrawHill, 2012

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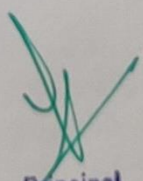Natham, Dindigul (Dt) - 624 401.

Date: 15.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the students of third year ECE of NPR College of Engineering & Technology, Natham have successfully done the Internship training in our concern from 21.02.22 to 07.03.2022

During this period they were sincere and hardworking.

S.No.	Name of the student	Register Number	Year& Branch
1.	Ajith Kumar .K	920819106008	III ECE
2.	Asma Roshan. T	920819106007	III ECE
3.	Jyothika .B	920819106021	III ECE
4.	Kamalesh.K	920819106022	III ECE
5.	Keerthi.M	920819106024	III ECE

Principal
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With Regards

(For Elysium technologies)

EC8095	VLSIDESIGN	L	T	P	C
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OBJECTIVES:
- StudythefundamentalsofCMOS circuitsanditscharacteristics.
- Learn thedesignandrealizationofcombinational&sequentialdigitalcircuits.
- Architectural choices and performance tradeoffs involved in designing and realizing thecircuits inCMOStechnologyarediscussed
- LearnthedifferentFPGAarchitecturesandtestabilityofVLSIcircuits.

UNITI   INTRODUCTIONTOMOSTRANSISTOR   9

MOS Transistor, CMOS logic, Inverter, Pass Transistor, Transmission gate, Layout Design Rules,Gate Layouts, Stick Diagrams, Long-Channel I-V Charters tics, C-V Charters tics, Non idealI-VEffects,DCTransfercharacteristics,   RCDelayModel,ElmoreDelay,Linear DelayModel,Logicaleffort,ParasiticDelay,DelayinLogicGate,Scaling.

UNITII   COMBINATIONALMOSLOGIC CIRCUITS   9

CircuitFamilies:StaticCMOS,RatioedCircuits,CascodeVoltageSwitchLogic,DynamicCircuits, Pass Transistor Logic, Transmission Gates, Domino, Dual Rail Domino, CPL, DCVSPG,DPL,CircuitPitfalls.

Power:DynamicPower,StaticPower,LowPowerArchitecture.

UNITIII   SEQUENTIAL CIRCUITDESIGN   9

Static latches and Registers, Dynamic latches and Registers, Pulse Registers, Sense AmplifierBased Register, Pipelining, Schmitt Trigger, Monostable Sequential Circuits, Astable SequentialCircuits.

TimingIssues:TimingClassificationOfDigitalSystem,SynchronousDesign.

UNITIV   DESIGNOFARITHMETICBUILDINGBLOCKSANDSUBSYSTEM   9

Arithmetic Building Blocks: Data Paths, Adders, Multipliers, Shifters, ALUs, power and speedtradeoffs,CaseStudy:Designasatradeoff.

Designing Memory and Array structures: Memory Architectures and Building Blocks, MemoryCore,MemoryPeripheral Circuitry.

UNITV   IMPLEMENTATIONSTRATEGIESAND TESTING   9

FPGABuildingBlockArchitectures,FPGAInterconnectRoutingProcedures.DesignforTestability: Ad Hoc Testing, Scan Design, BIST, IDDQ Testing, Design for Manufacturability,BoundaryScan.

TOTAL:45PERIODS

OUTCOMES:
UPONCOMPLETIONOFTHE COURSE,STUDENTS SHOULDbeABLE TO
- Realizethe conceptsofdigitalbuildingblocksusingMOStransistor.
- DesigncombinationalMOS circuitsandpowerstrategies.
- DesignandconstructSequentialCircuitsand Timingsystems.
- Designarithmeticbuildingblocksandmemorysubsystems.
- ApplyandimplementFPGAdesignflowandtesting.

TEXT BOOKS:
1. Neil H.E. Weste, David Money Harris "CMOS VLSI Design: A Circuits and SystemsPerspective",4thEdition,Pearson,2017(UNIT I,II,V)
2. Jan M. Rabaey ,AnanthaChandrakasan, Borivoje. Nikolic, "Digital Integrated Circuits:ADesignperspective",SecondEdition,Pearson,2016.(UNIT III,IV)

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REFERENCES

1. M.J.Smith,"Application SpecificIntegratedCircuits",AddissonWesley,1997
2. Sung-Mo kang, Yusuf leblebici, Chulwoo Kim "CMOS Digital Integrated Circuits:Analysis&Design",4th editionMcGraw Hill Education,2013
3. WayneWolf,"ModernVLSIDesign:SystemOnChip",PearsonEducation,2007
4. R.JacobBaker,HarryW.LI.,David E.Boyee,"CMOSCircuitDesign,LayoutandSimulation",PrenticeHall ofIndia2005.

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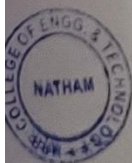
Vi Microsystems Pvt. Ltd.,

Plot No.75, Electronics Estate, Perungudi, Chennai - 600096.
Tel : 044-2496 1842, 2496 1852
E-mail : sales@vimicrosystems.com   Website : www.vimicrosystems.com
GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date: 15.03.2022

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Vishali K** (920819106069) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 15 days from 24.02.22 to 10.03.22.

During the period, her conduct was found to be good.

With Regards

For VI Microsystems

Principal
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Natham, Dindigul (Dt) - 624 401

Vi Microsystems Pvt. Ltd.,

Date: 15.03.2022

TO WHOM IT MAY CONCERN
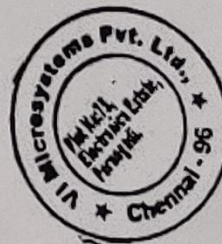
This is to certify that **Ms. Sumuga Priya M** (920819106062) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 15 days from 24.02.22 to 10.03.22.

During the period, her conduct was found to be good.

With Regards

For VI Microsystems

Principal
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EC8652   WIRELESSCOMMUNICATION   L T P C
                                                                  3 0 0 3
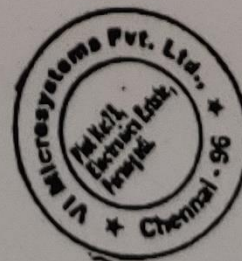
OBJECTIVES:

- Tostudythe characteristicofwirelesschannel
- Tounderstandthedesignofacellularsystem
- To studythe variousdigitalsignalingtechniquesand multipathmitigationtechniques
- Tounderstandtheconceptsofmultipleantennatechniques

UNITI   WIRELESSCHANNELS   9

Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budgetdesign – Small scale fading- Parameters of mobile multipath channels – Time dispersionparameters-Coherencebandwidth–
Dopplerspread&Coherencetime,fadingduetoMultipath time delay spread – flat fading – frequency selective fading – Fading due toDopplerspread–fastfading–slowfading.

UNITII   CELLULARARCHITECTURE   9

MultipleAccesstechniques-FDMA,TDMA,CDMA–Capacitycalculations–Cellularconcept-Frequency reuse - channel assignment- hand off- interference & system capacity-trunking&gradeofservice–Coverageandcapacity improvement.

UNITIII   DIGITALSIGNALINGFORFADINGCHANNELS   9

Structureofawirelesscommunicationlink,PrinciplesofOffset-QPSK,p/4-
DQPSK,MinimumShiftKeying,GaussianMinimumShiftKeying,Errorperformanceinfadingchannels,OFDMprinciple–Cyclicprefix,Windowing,PAPR.

UNITIV   MULTIPATH MITIGATIONTECHNIQUES   9

Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing andLMSAlgorithms.Diversity–   MicroandMacro   diversity,   Diversitycombining techniques,Errorprobability infadingchannelswithdiversityreception,Rakereceiver.

UNITV   MULTIPLEANTENNATECHNIQUES   9

MIMOsystems–spatialmultiplexing-Systemmodel-Pre-coding-Beamforming-transmitter diversity, receiver diversity- Channel state information-capacity in fading andnon-fadingchannels.

                                     TOTAL: 45   PERIODS

OUTCOMES:

Thestudentshouldbeable to:

- Characterizeawirelesschannelandevolvethe systemdesign specifications
- Designacellularsystembasedonresourceavailabilityandtrafficdemands
- Identifysuitablesignalingandmultipathmitigationtechniquesforthewirelesschannelands ystemunderconsideration.

TEXT BOOKS:

1. Rappaport,T.S.,—Wirelesscommunicationsl,PearsonEducation,SecondEdition, 2010.(UNITI,II,IV)
2. Andreas.F.Molisch,—WirelessCommunicationsl,JohnWiley–India,2006.(UNITIII,V)

REFERENCES:

1. WirelessCommunication–AndreaGoldsmith,CambridgeUniversityPress,2011
2. VanNee,R.andRamjiPrasad,—OFDMforwirelessmultimediacommunications, ArtechHouse,2000
3. DavidTseandPramodViswanath,—FundamentalsofWirelessCommunication, CambridgeUniversityPress,2005.
4. UpenaDalal,—WirelessCommunicationl,OxfordUniversityPress,2009.

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MINE RESCUE ENSEMBLES
FOR UNDERGROUND COAL MINING
A PROJECT REPORT

Submitted by

HARIPRIYA M	**920818106009**
SEEMA FATHIMA S	**920818106029**

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

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JUNE 2022

Dr. J.SUNDARARAJAN,
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ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "Mine rescue ensembles for underground coal mining" is the bonafide work of **HARIPRIYA M (920818106009), SEEMA FATHIMA S (920818106029)** who carried out the work under my supervision.

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Submitted for practical examination of EC8811 – Project work held at NPR College of Engineering and Technology, Natham on 24.06.2022

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTARCT

Safety is the most vital part of any type of industry. In the mining industry safety and security is a fundamental aspect of all. To avoid any types of accidents mining industry follows some basic precautions. Still accident takes place in underground mines due to rise in temperature, increased water level, and methane gas leakage. Here we provide safety to workers. When workers in danger, the updated in IoT server. To enhance safety in underground mines, a reliable communication system must be established between workers in the underground mines and fixed ground mine system. The communication network must not be interrupted at any moment and at any condition. A cost-effective supervising system with early warning intelligence is proposed in this project. Worker's status can be monitor over IoT.

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CHAPTER 6

CONCLUSION AND FUTURE WORK

The coal mine safety system is implemented using smoke sensors, respiratory sensors, heartbeat sensors for obtaining and health parameters environmental conditions. A smart alert system is implemented for the safety of mineworkers by alerting them at the right time to escape from the mining environment in case of any accidents. This system constantly observes the coalmine and alerts the worker and the authorized person from the ground station by using IoT technology. The environment and health status of the mineworkers have continuously updated on the IoT web page. The system is cost-effective and efficient with which the medical data of the mine worker is obtained and used for further artificial intelligence-based medical prognosis. Hence the proposed system reduces the death rate and disease alerts for the workers in the mining industry.

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EC8651   TRANSMISSIONLINESAND RFSYSTEMS   L T P C
                                            3 0 0 3

OBJECTIVES:
- To introducethe varioustypesoftransmission linesand itscharacteristics
- Togivethoroughunderstandingabouthighfrequencyline,powerandimpedancemeasurements
- Toimparttechnicalknowledgeinimpedancematchingusingsmithchart
- Tointroducepassivefiltersandbasic knowledgeof activeRFcomponents
- To getacquaintancewithRFsystemtransceiverdesign

UNITI   TRANSMISSIONLINETHEORY   9

General theory of Transmission lines - the transmission line - general solution - The infinite line - Wavelength, velocity of propagation - Waveform distortion - the distortion-less line - Loading anddifferent methods of loading - Line not terminated in Z0 - Reflection coefficient - calculation ofcurrent, voltage, power delivered and efficiency of transmission - Input and transfer impedance -Openandshortcircuitedlines-reflectionfactorandreflectionloss.

UNITII   HIGHFREQUENCYTRANSMISSIONLINES   9

Transmission line equations at radio frequencies - Line of Zero dissipation - Voltage and currenton the dissipation-less line, Standing Waves, Nodes, Standing Wave Ratio - Input impedance ofthe dissipation-less line - Open and short circuited lines - Power and impedance measurementonlines-Reflectionlosses -MeasurementofVSWRandwavelength.

UNITIII   IMPEDANCEMATCHINGINHIGHFREQUENCYLINES   9

Impedance matching: Quarter wave transformer - Impedance matching by stubs - Single stuband double stub matching - Smith chart - Solutions of problems using Smith chart - Single anddoublestubmatchingusingSmithchart.

UNITIV   WAVEGUIDES   9

General Wave behavior along uniform guiding structures – Transverse Electromagnetic Waves,Transverse Magnetic Waves, Transverse Electric Waves – TM and TE Waves between parallelplates.FieldEquationsinrectangularwaveguides,TMandTEwavesinrectangularwaveguides ,Bessel Functions,TMandTEwavesinCircularwaveguides.

UNITV   RF SYSTEMDESIGNCONCEPTS   9

Active RF components: Semiconductor basics in RF, bipolar junction transistors, RF field effecttransistors, High electron mobility transistors Basic concepts of RF design, Mixers, Low noiseamplifiers, voltagecontrol oscillators, Power amplifiers, transducer power gain andstabilityconsiderations.

TOTAL:45PERIODS

OUTCOMES:
Uponcompletionofthe course,the studentshouldbe ableto:
- Explain thecharacteristicsof transmission linesand itslosses
- Writeaboutthestandingwaveratioandinputimpedanceinhighfrequencytransmissionlines
- Analyze impedance matchingbystubsusing smith charts
- AnalyzethecharacteristicsofTE and TMwaves
- DesignaRFtransceiversystemforwireless communication

TEXTBOOKS:
1. JohnDRyder,"Networks,linesandfields",2ndEdition,PrenticeHallIndia,2015.(UNITI-IV)
2. MathewM.Radmanesh,"RadioFrequency&MicrowaveElectronics",PearsonEducationAsia,Sec ondEdition,2002.(UNIT V)

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34

REFERENCES:

1. ReinholdLudwigandPowelBretchko," RFCircuitDesign–
   TheoryandApplications",PearsonEducationAsia,FirstEdition,2001.
2. D.K.Misra,"RadioFrequencyandMicrowaveCommunicationCircuits-
   AnalysisandDesign",JohnWiley&Sons,2004.
3. E.C.JordanandK.G.Balmain,—ElectromagneticWavesandRadiatingSystemsPrentice
   HallofIndia,2006.
4. G.S.NRaju,"ElectromagneticFieldTheoryandTransmissionLinesPearsonEducation,

LIFI BASED AUTOMATED SMART TROLLEY USING RFID

A PROJECT REPORT

Submitted by

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NISHA.M	**(920818106018)**
VIVEKA.S	**(920818106040)**

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BONAFIDE CERTIFICATE

Certified that this project report "**LIFI BASED AUTOMATED SMART TROLLEY USING RFID**" is the bonafide work of "**ABINAYA.S (920818106002), NISHA.M (920818106018), VIVEKA.S (920818106040)**" who carried out the project work under my supervision.

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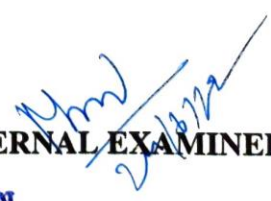
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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

A Progressive product is one that lessens manual labor and aids the society with increased comfort and gives a robust performance in everyday life. Such a product is appreciated by the society. Nowadays, buying necessary items at supermarkets and malls has been a daily activity in numerous cities. We observe tremendous rush at shops, especially in the vacation periods and at the weekends. This rush becomes gigantic during the period of various offers and discounts. On such occasions, customers purchase a variety of objects in the supermarkets and put them in a trolley. The very next thing they do is to find the specific product on the list, and a queue to pay at the billing counter. It is a tedious and time-consuming process. To avoid this rigmarole, we are growing a system which we have named as the "LI-FI Based Automated Smart Trolley Using RFID". In this system, we have used the RFID tags in the place of the traditional barcodes. Every product has an RFID tag. Whenever the customer places a particular product inside the trolley, it is scanned through the RFID reader. The weight and cost of the product could be displayed on a private computer. To implement this, we are using Visible Light Communication (VLC) technology to send the corresponding statistics to the central computer. At the billing counter, a Li-Fi receiver is placed, which collects the required information from the Li-Fi transmitter linked to the RF reader. And an LCD display is also placed on the trolley which displays the total amount and number of products, which the customer has purchased.

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IV

CHAPTER 7

CONCLUSION & FUTURE WORK

A system based on RFID technology that could replace the traditional barcode system was successfully established. The barcode system had various drawbacks including the strict requirements online of sight and its need to be placed in one particular boundary while scanning, not to mention the issues concerning its durability and inability to update information. The only constraint that RFID scanning is known to have is the distance and range coverage. RFID tags are durable and allow constant update of information as well as a rewrite of data to account for changes. They can also operate in extreme temperature conditions and are not susceptible to physical wear and tear or damage under water. This makes the process reliable, flexible and adaptive. The developed product is easy to use and does not require any specific training. It has the effective usage of LI-FI technology, and the smart trolley can minimize the queues in the mall. So that customer's time can be saved. It also uses a LCD display in trolley so that the customer can see the amount for which they have purchased.

In Future, the LCD can be provided with a layout of the shopping market by which the customers can be able to get the exact information about the products present in different aisles. This increase user friendliness.

The smart trolley could interact with customers during a shopping trip. For example, passing on discount vouchers based on where they are in the supermarket. The movement of the trolley can be made automatically with the help of various sensors. In this way, there is no need to pull the heavy trolley

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EC8004   WIRELESSNETWORKS   LTP C
                                                            3003

OBJECTIVES:
The studentshouldbemade:

- To understandtheconceptaboutWirelessnetworks,protocolstackand standards
- To understandandanalysethenetworklayersolutionsforWirelessnetworks
- Tostudyaboutfundamentalsof 3GServices, itsprotocolsandapplications
- TohaveindepthknowledgeoninternetworkingofWLANandWWAN
- To learnaboutevolutionof 4GNetworks, itsarchitecture andapplications

UNITI   WIRELESSLAN   9
Introduction-WLAN technologies: - IEEE802.11: System architecture, protocol architecture,802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, WPAN –IEEE802.15.4,WirelessUSB,Zigbee,6LoWPAN,WirelessHART

UNITII   MOBILENETWORKLAYER   9
Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation,IPV6-Networklayerintheinternet-MobileIPsessioninitiationprotocol-mobilead-hocnetwork:Routing:DestinationSequencedistancevector,IoT:CoAP

UNITIII   3GOVERVIEW   9
Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3GPPArchitecture,Userequipment,CDMA2000overview-
RadioandNetworkcomponents,Network structure,RadioNetwork,TD-CDMA,TD–SCDMA.

UNITIV   INTERNETWORKINGBETWEENWLANSANDWWANS   9
Internetworking objectives and requirements, Schemes to connect WLANS and 3G Networks,SessionMobility,InternetworkingArchitecturefor
WLANandGPRS,SystemDescription,LocalMultipointDistributionService,MultichannelMultipoint DistributionSystem.

UNITV   4G& Beyond   9
Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies:MulticarrierModulation,Smartantennatechniques,IMSArchitecture,LTE,Advanced BroadbandWirelessAccessandServices,MVNO.

                                                           TOTAL:45PERIODS

OUTCOMES:
Uponcompletionofthecourse,thestudentwouldbeable to:

- Conversantwiththelatest3G/4Gnetworksanditsarchitecture
- Designandimplementwirelessnetworkenvironmentforanyapplicationusinglatestwireless protocolsandstandards
- Abilityto selectthesuitablenetworkdependingonthe availabilityand requirement
- Implementdifferenttypeofapplicationsforsmartphonesandmobiledeviceswithlatestnetwor kstrategies

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education2012.(UnitI,II,III)

2. Vijay Garg, "Wireless Communications and networking", First Edition, Elsevier 2007.(UnitIV,V)

REFERENCES:
1. Erik Dahlman, Stefan Parkvath, Johan Skold and Per Beming, "3G Evolution HSPA and LTEforMobileBroadband",SecondEdition,Academic Press,2008.
2. AnuragKumar,D.Manjunath,Joykuri,"WirelessNetworking",FirstEdition,Elsevier2011.
3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", FirstEdition,PearsonEducation2013

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SENSORY NERVE CONDUCTION SYSTEM WITH NON INVASIVE GLUCOSE MONITORING USING IOT

A PROJECT REPORT

Submitted by

DURGADEVI S	**(920818106008)**
PUSHPA PRIYADHARSHINI R	**(920818106023)**
SARITHARANI K	**(920818106026)**

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JUNE 2022

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BONAFIDE CERTIFICATE

Certified that this project report " **SENSORY NERVE CONDUCTION SYSTEM WITH NON INVASIVE GLUCOSE MONITORING USING IOT** "is the Bonafide work of "**DURGADEVI.S (920818106008), PUSHPA PRIYADHARSHINI.R (920818106023), SARITHARANI.K (920818106026)**" who carried out the project work under my supervision.

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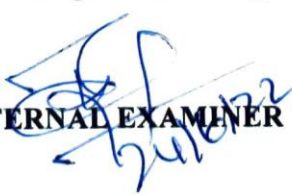**Dr. S.PONMALAR M.E., Ph.D.,**
HEAD OF THE DEPARTMENT

Professor,
Department of Electronics and
Communication Engineering,
NPR College of Engineering and
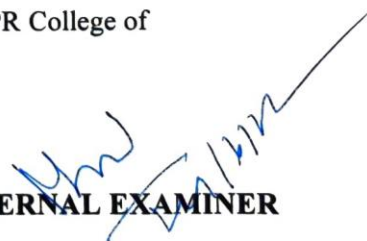Technology, Natham,
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INTERNAL EXAMINER

EXTERNAL EXAMINER

ii

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ABSTRACT

Our project is about previous prediction of defecting nerve along with continuous monitoring of glycemic by using noninvasive method. Due to hyper glycaemia which may leads to nerve damage also. It mainly offers online monitoring of patients by doctors for prescribing medications further. It shows the values of glycaemia and variation value in nerve conduction from that we can identify the healthy nerve. In further we implemented our project with embedded technology and IoT (Internet of things) using Arduino controller with sensor nodes that are used for monitoring and data transferring to the cloud. The main objective of our project is non invasive identification of defective nerve and blood glucose monitoring with concurrent nerve study is proposed and concerns for home based health monitoring. Our framework can improve the learning ability and achieve a higher performance

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iv

CHAPTER-7
CONCLUSION AND FUTURE WORK

With the wide use of internet, this work is concentrated to execute the internet technology to establish a system which would communicate through internet for better health. Internet of Things rules the whole world in various fields, mainly in health care sectors. Hence the present work is done to design an Internet of Things based smart patient health tracking system using an Arduino microcontroller. In this, optical sensor is used to detect the glucose level and temperature sensor to read the temperature and sends the data to the cloud using internet. This information is also sent to the LCD display, so patient can easily know their health status. During critical situations to alert the doctor, the warning message is sent to the. The doctor can view the sent data by logging the specific website or IP address. Hence continuous patient monitoring system is designed. In future work we can modify the method of calculating glucose level and Moreover we can identify unusual nerve disorder using this method.

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EC8393   FUNDAMENTAL SOFDATASTRUCTURESINC   **LTPC**
                                                                          3003

OBJECTIVES:

- TolearnthefeaturesofC
- To learnthelinearandnon-lineardatastructures
- To exploretheapplicationsoflinearandnon-lineardatastructures
- Tolearntorepresentdatausinggraphdatastructure
- To learn thebasicsortingandsearchingalgorithms

UNITI   C PROGRAMMINGBASICS   9

StructureofaCprogram–compilationandlinkingprocesses–Constants,Variables–DataTypes – Expressions using operators in C – Managing Input and Output operations – Decision Makingand Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional andTwo-dimensional arrays. Strings- String operations – String Arrays.Simple programs- sorting-searching–matrixoperations.

UNITII   FUNCTIONS,POINTERS,STRUCTURESANDUNIONS   9

Functions – Pass by value – Pass by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic. Structures and unions - definition – Structure within a structure - Union - ProgramsusingstructuresandUnions –Storageclasses,Pre-processordirectives.

UNITIII   LINEAR DATASTRUCTURES   9

Arraysanditsrepresentations–StacksandQueues–Linkedlists–Linkedlist-basedimplementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomialaddition.

UNITIV   NON-LINEAR DATASTRUCTURES   9

Trees–BinaryTrees–Binarytreerepresentationandtraversals–BinarySearchTrees–Applications of trees. Set representations - Union-Find operations. Graph and its representations – GraphTraversals.

UNITV   SEARCHINGANDSORTINGALGORITHMS   9

LinearSearch–Binary Search.BubbleSort,Insertionsort–Mergesort–Quick sort-Hashtables – Overflowhandling.

                                                   TOTAL:45PERIODS

OUTCOMES:

Uponcompletionofthecourse,studentswillbeable to:

- Implementlinearandnon-lineardatastructure operationsusingC
- Suggestappropriatelinear/non-lineardata structureforanygiven dataset.
- Applyhashingconceptsforagivenproblem
- Modifyorsuggestnewdatastructureforanapplication
- Appropriatelychoosethe sortingalgorithmforanapplication

TEXTBOOKS:

1. PradipDeyandManasGhosh,—ProgramminginC,SecondEdition,OxfordUniversity Press,2011.
2. EllisHorowitz,SartajSahni,Susan Anderson-Freed,—FundamentalsofData Structuresin C,SecondEdition,UniversityPress,2008.

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1. MarkAllenWeiss,—DataStructuresandAlgorithmAnalysisinC,SecondEdition, PearsonEducation,1996
2. AlfredV.Aho,JohnE.HopcroftandJeffreyD.Ullman,—DataStructuresandAlgorithms, PearsonEducation,1983.
3. RobertKruse,C.L.Tondo,BruceLeung,ShashiMogalla,—DataStructuresandProgram DesigninC,SecondEdition,PearsonEducation,2007
4. Jean-PaulTremblayandPaulG.Sorenson,—AnIntroductiontoDataStructureswith Applications,SecondEdition,TataMcGraw-Hill,1991.

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BLOCKCHAIN BASED SECURE AND ENERGY EFFICIENT ROUTING PROTOCOL FOR WSN

A PROJECT REPORT

Submitted by

NIVETHA.K S	**(920818106019)**
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VISHALINI.B	**(920818106039)**

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BONAFIDE CERTIFICATE

Certified that this project report **"BLOCKCHAIN BASED SECURE AND ENERGY EFFICIENT ROUTING PROTOCOL FOR WSN"** in theBonafide work of **NIVETHA. K.S(920818106019) , SARMATHI. R (920818106027), VISHALINI.B (920818106039)** who carried out the projectunder my supervision, during the academic year 2021-2022.

SIGNATURE

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HEAD OF THE DEPARTMENT
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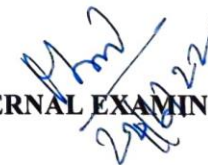Technology, Natham,
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Submitted for the project viva-voce examination held at NPR College of Engineering & Technology in Natham on <u>24-06-2022.</u>

INTERNAL EXAMINAR

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ABSTRACT

In this paper, an encryption and trust evaluation model is proposed on the basis of block chain in which the identities of Aggregator Nodes (ANs) and SensorNodes (SNs) are stored. The authentication of ANs and SNs are performed in public and private block chains, respectively. However, inauthentic nodes utilize the network's resources and perform malicious activities. Moreover, the SNs have limited energy, transmission range and computational capabilities, and are attacked by malicious nodes. Afterwards, the malicious nodes transmit wrong information of the route and increase the number of retransmissions due to which SNs energy is rapidly consumed. The lifespan of the wireless sensor network is reduced due tothe rapid energy dissipation of SNs. Furthermore, the throughput increases and packet loss increase with presence of malicious nodes in the network. The trust values of SNs are computes to eradicate the malicious nodes from the network. Secure routing in the network is performed considering residual energy and trust values of SNs. Moreover, the Rivest-Shamir-Adlemen (RSA), a cryptosystem thatprovides a asymmetric key, is used for securing data transmission. The simulationresults show the effectiveness of the proposed model in terms of high packet delivery ratio.

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IV

CHAPTER- 7

CONCLUSION AND FUTURE WORK

In this project, we present a secure authentication and routing mechanism for WSNs. The aim of our proposed mechanism is to carry out authentication of the sensor nodes and ensure the secure communication between the nodes and BS. The proposed routing protocol selects the nodes on the basis of shortest distance from the BS. Whereas, a secure authentication mechanism of nodes is performed using the Bidirectional-blockchain .Results show that our proposed model improves the packet delivery ratio and the network lifetime. In future work, the proposed idea will be tested on larger networks and a realistic routing environment.

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67

MA8451　　　　　PROBABILITY ANDRANDOMPROCESSES

L	T	P	C
4	0	0	4

OBJECTIVES:

- To provide necessary basic concepts in probability and random processes for applicationssuchas randomsignals,linearsystemsincommunicationengineering.
- Tounderstandthebasicconceptsofprobability,oneandtwodimensionalrandomvariables and to introduce some standard distributions applicable to engineering which candescribereal lifephenomenon.
- TounderstandthebasicconceptsofrandomprocesseswhicharewidelyusedinITfields.
- Tounderstandtheconceptofcorrelationand spectraldensities.
- Tounderstandthe significanceoflinearsystemswith randominputs.

UNITI　　　　PROBABILITYAND RANDOMVARIABLES 　　　　　　12

Probability – Axioms of probability – Conditional probability – Baye's theorem - Discrete andcontinuous random variables – Moments – Moment generating functions – Binomial, Poisson,Geometric,Uniform,ExponentialandNormaldistributions.

UNITII　　　　TWO-DIMENSIONAL RANDOMVARIABLES 　　　　　　12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linearregression – Transformation of random variables – Central limit theorem (for independent andidenticallydistributedrandomvariables).

UNITIII　　　　RANDOMPROCESSES 　　　　　　12

Classification – Stationary process – Markov process - Markov chain - Poisson process – Randomtelegraphprocess.

UNITIV　　　　CORRELATION AND SPECTRAL DENSITIES 　　　　　　12

Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectraldensity–Properties.

UNITV　　　　LINEAR SYSTEMS WITHRANDOMINPUTS 　　　　　　12

Linear time invariant system – System transfer function – Linear systems with random inputs – Autocorrelationandcross correlationfunctionsofinputandoutput.

　　　　　　　　　　　　　　　　　　TOTAL:60PERIODSOUTCOMES:

Uponsuccessfulcompletionofthecourse,studentsshouldbeableto:

- Understand the fundamentalknowledgeofthe conceptsofprobabilityand haveknowledgeofstandarddistributionswhichcandescribereallifephenomenon.
- Understandthebasicconceptsofoneandtwodimensionalrandomvariablesandapplyinengineeri ngapplications.
- Applytheconceptrandomprocessesin engineeringdisciplines.
- Understandandapplytheconceptofcorrelationand spectraldensities.
- The students will have an exposure of various distribution functions and help in acquiringskills in handling situations involving more than one variable. Able to analyze the responseofrandominputs tolineartimeinvariantsystems.

TEXT BOOKS:

1. Ibe,O.C.,"FundamentalsofAppliedProbabilityandRandomProcesses",1stIndianReprint,Elsevier,2 007.
2. Peebles,P.Z.,"Probability,RandomVariablesandRandomSignalPrinciples",TataMcGrawHill,4th Edition,New Delhi,2002.

segatronics _____

Date: 10.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms.MAHAVARSHINI.S (920820106019)** doing Second year B.E, Electronics and Communication Engineering in NPR College of Engineering & Technology, Natham has undergone the In-plant training program offered by our organization during the period of 03.03.22 – 10.03.22

We wish her every success in life.

For **Megatronics**

(C.Kathan)

Principal
N.P.R. College of Engineering & Techno
Natham, Dindigul (Dt) - 624 401

Date: 10.03.2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. NANDHINI.A (920820106020)** doing Second year B.E, Electronics and Communication Engineering in NPR College of Engineering & Technology, Natham has undergone the In-plant training program offered by our organization during the period of 03.03.22 – 10.03.22

We wish her every success in life.

For Megatronics

(C.Kannan)

Principal
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EC8701 ANTENNAS AND MICROWAVE ENGINEERING

L	T	P	C
3	0	0	3

OBJECTIVES:
- To enable the student to understand the basic principles in antenna and microwavesystem design
- To enhance the student knowledge in the area of various antenna designs.
- To enhance the student knowledge in the area of microwave components andantenna for practical applications.

UNIT I   INTRODUCTION TO MICROWAVE SYSTEMS AND ANTENNAS   9

Microwave frequency bands, Physical concept of radiation, Near- and far-field regions, Fields and Power Radiated by an Antenna, Antenna Pattern Characteristics, Antenna Gain and Efficiency, Aperture Efficiency and Effective Area, Antenna Noise Temperature and G/T, Impedance matching, Friis transmission equation, Link budget and link margin, Noise Characterization of a microwave receiver.

UNIT II   RADIATION MECHANISMS AND DESIGN ASPECTS   9

Radiation Mechanisms of Linear Wire and Loop antennas, Aperture antennas, Reflector antennas, Microstrip antennas and Frequency independent antennas, Design considerationsand applications.

UNIT III   ANTENNA ARRAYS AND APPLICATIONS   9

Two-element array, Array factor, Pattern multiplication, Uniformly spaced arrays with uniformand non-uniform excitation amplitudes, Smart antennas.

UNIT IV   PASSIVE AND ACTIVE MICROWAVE DEVICES   9

Microwave Passive components: Directional Coupler, Power Divider, Magic Tee, attenuator, resonator, Principles of Microwave Semiconductor Devices: Gunn Diodes, IMPATT diodes, Schottky Barrier diodes, PIN diodes, Microwave tubes: Klystron, TWT, Magnetron.

UNIT V   MICROWAVE DESIGN PRINCIPLES   9

Impedance transformation, Impedance Matching, Microwave Filter Design, RF and Microwave Amplifier Design, Microwave Power amplifier Design, Low Noise Amplifier Design, Microwave Mixer Design, Microwave Oscillator Design

TOTAL: 45 PERIODS

OUTCOMES:
The student should be able to:
- Apply the basic principles and evaluate antenna parameters and link power budgets
- Design and assess the performance of various antennas
- Design a microwave system given the application specifications

TEXTBOOKS:
1. John D Krauss, Ronald J Marhefka and Ahmad S. Khan, "Antennas and WavePropagation: Fourth Edition, Tata McGraw-Hill,

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39

2006. (UNIT I, II, III)
2. David M. Pozar, "Microwave Engineering", Fourth Edition, Wiley India, 2012.(UNITI,IV,V)

REFERENCES:
1. Constantine A.Balanis, "Antenna Theory Analysis and Design", Third edition, JohnWiley India Pvt Ltd., 2005.
2. R.E.Collin, "Foundations for Microwave Engineering", Second edition,IEEE Press, 2001

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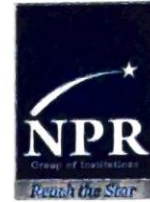
SMART PHONE BASED OBJECT RECOGNITION AND GUIDANCE FOR VISUALLY CHALLENGED PEOPLE

A PROJECT REPORT

Submitted by

R.KIRUTHIKA	**(920818106013)**
M. SWETHA	**(920818106035)**

In partial fulfillment for the award of the degree
of

BACHELOR OF ENGINEERING

In

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY

NATHAM, DINDIGUL-624 401

ANNA UNIVERSITY::CHENNAI 600 025

JUNE 2022

ANNA UNIVERSITY::CHENNAI 600 025
BONAFIDE CERTIFICATE

Certified that this project report "**SMART PHONE BASED OBJECT RECOGNITION AND GUIDANCE FOR VISUALLY CHALLENGED PEOPLE**" is the bonafide work of **R.KIRUTHIKA (920818106013), M.SWETHA (920818106035)** who carried out the work under my supervision.

SIGNATURE

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Submitted for the project viva-voce examination held at NPR College of Engineering and Technology in Natham on 24.06.22

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Blindness is a quality of our being. It's as integral to our identities as our nationality, language, and personality. In fact, it's often so fundamental to us that we begin to forget that we're blind. Stick based existing solution only detects obstacles .In this project, propose an artificial intelligence-based stick model for guiding blind people. To assist visually impaired people with obstacle free path-finding. To convert Image into the audio output (Speech) through the use of Artificial intelligence. Detect the image and convert it into audio file. Further, automatic fall on alert is introduced by the use of GSM technology. The proposed model consists of Arduino controller, mp3 player ,GSM , Vibration sensor and voice processor. The scenarios for the usability testing of overall system for blind to evaluate the usability were presented.

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CHAPTER-12

CONCLUSION& FUTURE WORK

In this project, a guidance navigation system for blind people was presented. The approach of the system is based on the idea that a blind pedestrian can be assisted by spoken instructions from a controller by integrating sensors like ultrasonic and AI based object recognition .The scenarios for the usability testing of overall system for blind to evaluate the usability were presented.

FUTURE WORK

Braille system was developed to eradicate the darkness of visually impaired people and make them gain knowledge for proper interaction with the World. It provides a new opportunity for blind individuals to learn and communicate more effectively with the rest of the World. In Assistive Technology, software-based text-to-Braille translation has proven to be a viable option. Future work presents a communicator, a hardware setup that helps visually challenged people to communicate, among others. The work aims to eliminate the divide between blind users and end-users in telecommunications and make them more robust by providing them with the total enhancements for interaction with others and servicing their necessities. A methodology is designed to create a Braille system that will enable vision-impaired people to communicate and engage.

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	L	T	P	C
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EC8751   OPTICAL COMMUNICATION

OBJECTIVES:

- To study about the various optical fiber modes, configuration and transmission characteristics of optical fibers
- To learn about the various optical sources, detectors and transmission techniques
- To explore various idea about optical fiber measurements and various coupling techniques
- To enrich the knowledge about optical communication systems and networks

UNIT I   INTRODUCTION TO OPTICAL FIBERS   9

Introduction-general optical fiber communication system- basic optical laws and definitions-optical modes and configurations -mode analysis for optical propagation through fibers-modes in planar wave guide-modes in cylindrical optical fiber-transverse electric and transverse magnetic modes- fiber materials-fiber fabrication techniques-fiber optic cables-classification of optical fiber-single mode fiber-graded index fiber.

UNIT II   TRANSMISSION CHARACTERISTIC OF OPTICAL FIBER   9

Attenuation-absorption --scattering losses-bending losses-core and cladding losses-signal dispersion –inter symbol interference and bandwidth-intra model dispersion-material dispersion- waveguide dispersion-polarization mode dispersion-intermodal dispersion-dispersion optimization of single mode fiber-characteristics of single mode fiber-R-I Profile-cutoff wave length-dispersion calculation-mode field diameter.

UNIT III   OPTICAL SOURCES AND DETECTORS   9

Sources: Intrinsic and extrinsic material-direct and indirect band gaps-LED-LED structures-surface emitting LED-Edge emitting LED-quantum efficiency and LED power-light source materials-modulation of LED-LASER diodes-modes and threshold conditions-Rate equations-external quantum efficiency-resonant frequencies-structures and radiation patterns-single mode laser-external modulation-temperature effort.

Detectors: PIN photo detector-Avalanche photo diodes-Photo detector noise-noisesources-SNR-detector response time-Avalanche multiplication noise-temperature effects-comparisons of photo detectors.

UNIT IV   OPTICAL RECEIVER, MEASUREMENTS AND COUPLING   9

Fundamental receiver operation-preamplifiers-digital signal transmission-error sources-Front end amplifiers-digital receiver performance-probability of error-receiver sensitivity-quantum limit.

Optical power measurement-attenuation measurement-dispersion measurement- Fiber Numerical Aperture Measurements- Fiber cut- off Wave length Measurements- Fiber diameter measurements-Source to Fiber Power Launching-Lensing Schemes for Coupling Management-Fiber to Fiber Joints-LED Coupling to Single Mode Fibers-Fiber Splicing-Optical Fiber connectors.

UNIT V   OPTICAL COMMUNICATION SYSTEMS AND NETWORKS   9

System design consideration Point – to –Point link design –Link power budget –rise time budget, WDM –Passive DWDM Components-Elements of optical networks-SONET/SDH-Optical Interfaces-SONET/SDH Rings and Networks-High speed light wave Links-OADM configuration-Optical ETHERNET-Soliton.

                    TOTAL:45 PERIODS

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OUTCOMES:
At the end of the course, the student should be able to:
- Realize basic elements in optical fibers, different modes and configurations.
- Analyze the transmission characteristics associated with dispersion and polarization techniques.
- Design optical sources and detectors with their use in optical communication system.
- Construct fiber optic receiver systems, measurements and coupling techniques.
- Design optical communication systems and its networks.

TEXT BOOKS:
1. P Chakrabarti, "Optical Fiber Communication", McGraw Hill Education (India)Private Limited, 2016 (UNIT I, II, III)
2. Gred Keiser,"Optical Fiber Communication", McGraw Hill Education (India) Private Limited. Fifth Edition, Reprint 2013. (UNIT I, IV, V)

REFERENCES:

1. John M.Senior, "Optical fiber communication", Pearson Education, second edition.2007.
2. Rajiv Ramaswami, "Optical Networks ", Second Edition, Elsevier , 2004.
3. J.Gower, "Optical Communication System", Prentice Hall of India, 2001.
4. Govind P. Agrawal, "Fiber-optic communication systems", third edition, John Wiley & sons, 2004.

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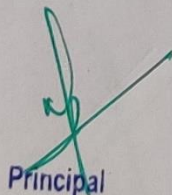GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date: 16.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Sasmitha Parveen S** (920819106054)
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in our organization for 08 days from 09.08.21 to 16.08.21.

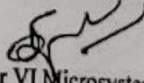During the period, her conduct was found to be good.

With Regards

For VI Microsystems

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GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date: 16.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Rishwana Burveen S** (920819106051) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone In-Plant training in our organization for 08 days from 09.08.21 to 16.08.21.

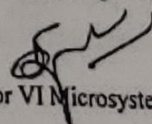During the period, her conduct was found to be good.

With Regards

For VI Microsystems

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EC8791   EMBEDDED AND REAL TIME SYSTEMS   L T P C
                                                                  3 0 0 3
OBJECTIVES:
The student should be made to:
- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

UNIT I   INTRODUCTION TO EMBEDDEDSYSTEM DESIGN   9
Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques - Designing with computing platforms – consumer electronics architecture – platform-level performance analysis.

UNIT II   ARM PROCESSOR AND PERIPHERALS   9
ARM Architecture Versions – ARM Architecture – Instruction Set – Stacks and Subroutines – Features of the LPC 214X Family – Peripherals – The Timer Unit – Pulse Width Modulation Unit – UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.

UNIT III   EMBEDDED PROGRAMMING   9
Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT IV   REAL TIME SYSTEMS   9
Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronisation.

UNIT V   PROCESSES AND OPERATING SYSTEMS   9
Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. - Distributed embedded systems – MPSoCs and shared memory multiprocessors. – Design Example - Audio player, Engine control unit – Video accelerator.

                                                     TOTAL: 45   PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

TEXT BOOKS:
1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (UNIT I, II, III, V)
2. Jane W.S.Liu," Real Time Systems", Pearson Education, Third Indian Reprint, 2003.(UNIT IV)

REFERENCES:
1. Lyla B.Das, "Embedded Systems : An Integrated Approach" Pearson Education, 2013.

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44

AUTHENTICATION SYSTEM BASED ON
VOTING USING EMBEDDED
TECHNOLOGY

A PROJECT REPORT

Submitted by

DURGA DEVI B   **920818106007**

VENNILA A   **920818106037**

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONIC AND COMMUNICATION ENGINEERING

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JUNE 2022

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BONAFIDE CERTIFICATE

Certified that this project report "**AUTHEHTICATION SYSTEM BASED ON VOTING USING EMBEDDED TECHNOLOGY**" is the bonafide work of **DURGA DEVI B** (920818106007), **VENNILA A** (920818106037) who carried out the work under my supervision.

SIGNATURE

Dr.S.PONMALAR,M.E.,Ph.D.,

HEAD OF THE DEPARTMENT

Professor,

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SIGNATURE

Mr.J.G.SABARISH.M.E.,

SUPERVISOR

Assistant professor,

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Submitted for practical examination of EC8811 – Project work held at NPR College ofEngineering and Technology, Natham on 24.6.22

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

Finger print based online voting system is an application where the user is recognized by his finger pattern. since the finger pattern of each human being is different, the voter can be easily authenticated. The system allows the voter to vote through his finger print. Finger print is used to uniquely identify the user. The finger print minutiae features are different for each human being. Finger print is used as an authentication of the voters. Voter can vote the candidate only once; the system will allow the candidate to vote for the second time. The system will allow admin to add the candidate's name and candidate photo who are nominated for the election. Admin only has the rights to add candidate name and photo who are nominated. Admin will register the voters name by verifying voter. Admin will authenticate the user by verifying the user's identity proof and then admin will register the voter. The number of candidates added to the system by the admin will be automatically deleted after the completion of the election. Admin has to add the date when the election going to end. The system will allow the user to vote for one time for a particular election. Admin can add any number of candidates when the new election will be announced. Admin can view the election result by using the election id. Even user can view the election result.

IV

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CHAPTER 7

CONCLUSION AND FUTURE WORK

On this project we concluded that this is the user-friendly approach to the available voting security system. This system achieves high accuracy and reliability by the use of one or more safety and security detection systems. Since it is the cost-effective anti-fraud voting system, it helps to reduce crime rate also. Hence these features make our proposed system more unique. Also, the fingerprint-based voting system provides more secure unlocking over conventional method like lock and key or even password-based system.

AD HOC AND WIRELESS SENSOR NETWORKS

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OBJECTIVES:

The student should be made to:

- Learn Ad hoc network and Sensor Network fundamentals
- Understand the different routing protocols
- Have an in-depth knowledge on sensor network architecture and design issues
- Understand the transport layer and security issues possible in Ad hoc and Sensor networks
- Have an exposure to mote programming platforms and tools

UNIT I   AD HOC NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS   9

Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking, Ad hoc wireless Internet, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV), On–Demand Routing protocols –Ad hoc On–Demand Distance Vector Routing (AODV).

UNIT II   SENSOR NETWORKS – INTRODUCTION & ARCHITECTURES   9

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture - Sensor Network Scenarios, Transceiver Design Considerations, Optimization Goals and Figures of Merit.

UNIT III   WSN NETWORKING CONCEPTS AND PROTOCOLS   9

MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Contention based protocols - PAMAS, Schedule based protocols – LEACH, IEEE 802.15.4 MAC protocol, Routing Protocols- Energy Efficient Routing, Challenges and Issues in Transport layer protocol.

UNIT IV   SENSOR NETWORK SECURITY   9

Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Layer wise attacks in wireless sensor networks, possible solutions for jamming, tampering, black hole attack, flooding attack. Key Distribution and Management, Secure Routing – SPINS, reliability requirements in sensor networks.

UNIT V   SENSOR NETWORK PLATFORMS AND TOOLS   9

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms – TinyOS, nesC, CONTIKIOS, Node-level Simulators – NS2 and its extension to sensor networks, COOJA, TOSSIM, Programming beyond individual nodes – State centric programming.

TOTAL:45 PERIODS

OUTCOMES:

At the end of the course, the student would be able to:

- Know the basics of Ad hoc networks and Wireless Sensor Networks
- Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
- Apply the knowledge to identify appropriate physical and MAC layer protocols
- Understand the transport layer and security issues possible in Ad hoc and sensor networks.
- Be familiar with the OS used in Wireless Sensor Networks and build basic modules

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Vi Microsystems Pvt. Ltd.,

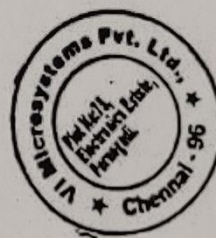Date: 24.08.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Uma Nanthini N** (920819106066) studying in Third year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone Internship in our organization for 16 days from 09.08.21 to 24.08.21.

During the period, her conduct was found to be good.

With Regards

For VI Microsystems

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Date: 26.08.2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the students of Third year ECE of NPR College of Engineering & Technology, Natham have successfully done the Internship in our concern from 11.08.21 to 26.08.2021.

During this period they were sincere and hardworking.

S.No.	Name of the student	Register Number	Year& Branch
1.	Mohan Babu B	920819106034	III ECE
2.	Muthu Moorthy M	920819106036	III ECE
3.	Prasanna D	920819106046	III ECE
4.	Singarabrindha N	920819106059	III ECE
5.	Vishali K	920819106069	III ECE

With Regards

(For Elysium Technologies)

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C8094   **SATELLITE COMMUNICATION**   L   T   P   C
                                                                        3   0   0   3

OBJECTIVES:
The student should be made to:
- Understand the basics of satellite orbits
- Understand the satellite segment and earth segment
- Analyze the various methods of satellite access
- Understand the applications of satellites
- Understand the basics of satellite Networks

UNIT I   SATELLITE ORBITS   9

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT II   SPACE SEGMENT   9

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command-Transponders-The Antenna Subsystem.

UNIT III   SATELLITE LINK DESIGN   9

Basic link analysis, Interference analysis, Rain induced attenuation and interference, Ionospheric characteristics, Link Design with and without frequency reuse.

UNIT IV   SATELLITE ACCESS AND CODING METHODS   9

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, DAMA Assignment Methods, compression – encryption, Coding Schemes.

UNIT V   SATELLITE APPLICATIONS   9

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. GPS Position Location Principles, Differential GPS, Direct Broadcast satellites (DBS/DTH).

                                                  TOTAL:45 PERIODS

OUTCOMES:
At the end of the course, the student would be able to:
- Analyze the satellite orbits
- Analyze the earth segment and space segment
- Analyze the satellite Link design
- Design various satellite applications

TEXT BOOKS:
1. Dennis Roddy, "Satellite Communication", 4th Edition, Mc Graw Hill International, 2006.
2. Timothy,Pratt,Charles,W.Bostain,JeremyE.Allnutt,"SatelliteCommunication",2nd   Edition, Wiley Publications,2002

REFERENCES:
1. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering", Prentice Hall/Pearson, 2007.
2. N.Agarwal, "Design of Geosynchronous Space Craft", Prentice Hall, 1986.
3. Bruce R. Elbert, "The Satellite Communication Applications", Hand Book, Artech House Bostan London, 1997.

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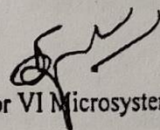GSTIN : 33AAACV0909J1ZJ   PAN No.: AAACV0909J

Date : 27.10.2020

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms.J.S.Karuniaa** (920819106023), studying in Second year Electronics and Communication Engineering of NPR College of Engineering & Technology, Natham has undergone internship in our organization from 12.10.2020 – 27.10.2020
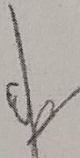
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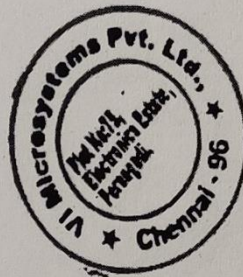
With Regards

For VI Microsystems

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EC8092	ADVANCED WIRELESS COMMUNICATION	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To expose the students to the importance of improving capacity of wireless channel using MIMO
- To enable understanding of channel impairment mitigation using space-time block and Trellis codes
- To teach advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

UNIT I   CAPACITY OF WIRELESS CHANNELS   9

The crowded spectrum, need for high data rate, MIMO systems – Array Gain, Diversity Gain, Data Pipes, Spatial MUX, MIMO System Model. MIMO System Capacity – channel known at the TX, Channel unknown to the TX – capacity of deterministic channels, Random channels and frequency selective channels.

UNIT II   RADIO WAVE PROPAGATION   9

Radio wave propagation – Macroscopic fading- free space and out door, small scale fading Fading measurements – Direct pulse measurements, spread spectrum correlation channel sounding frequency domain channel sounding, Antenna Diversity – Diversity combining methods.   9

UNIT III   SPACE TIME BLOCK CODES

Delay Diversity scheme, Alamoti space time code – Maximum likelihood decoding maximum ratio combining. Transmit diversity space time block codes for real signal constellation and complex signal constellation - decoding of STBC.

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UNIT IV   SPACE TIME TRELLIS CODES

9

Space time coded systems, space time code word design criteria, design of space time T C on slow fading channels, design of STTC on Fast Fading channels, performance analysis in slow and fast fading channels, effect of imperfect channel estimation and Antenna correlation on performance, comparison of STBC & STTC.

UNIT V   LAYERED SPACE TIME CODES

9

LST transmitter – Horizontal and Vertical LST receiver – ML Rx, Zero forcing Rx; MMSE Rx, SIC Rx, ZF V-blast Rx- MMSE V-blast Rx, Iterative Rx - capacity of MIMO – OFDM systems – capacity of MIMO multi user systems.

TOTAL : 45
PERIODS

OUTCOMES:
The student should be able to:

- Comprehend and appreciate the significance and role of this course in the presentcontemporary world
- Apply the knowledge about the importance of MIMO in today's communication
- Appreciate the various methods for improving the data rate of wireless communicationsystem

REFERENCES:

1. Mohinder Jankiraman, Space-time codes and MIMO systems, Artech House,Boston, London . www.artech house.com, ISBN 1-58053-865-7- 2004
2. Paulraj Rohit Nabar, Dhananjay Gore, Introduction of space time wirelesscommunication systems, Cambridge University Press, 2003.
3. David Tse and Pramod Viswanath, ―Fundamentals of Wireless Communication‖, Cambridge University Press, 2005.
4. Sergio Verdu " Multi User Detection" Cambridge University Press, 1998

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NATHAM

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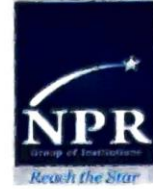
WATER QUALITY MONITORING AND

WASTE MANAGEMENT USING IOT

FOR SMART CITY

A PROJECT REPORT

Submitted by

MUKESH KANNA.G	**(920818106016)**
SURYA PRAKASH.V.M	**(920818106033)**
VIGNESH.S	**(920818106302)**

Impartial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY,

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JUNE2022

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ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"WATER QUALITY MONITORING AND WASTE MANAGEMENT USING IOT FOR SMART CITY"** in the Bonafide work of **MUKESH KANNA.G (920818106016), SURYA PRAKASH.V.M (920818106033), VIGNESH.G (920818106302)** who carried out the project under my supervision, during the academic year 2021-2022.

SIGNATURE

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Professor,
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SIGNATURE

Dr. A.GOPISAMINATHAN,
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SUPERVISOR
Professor,
Department of ECE,
NPR College of Engineering & Technology,
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Dindigul – 624 401.

Submitted for the project viva-voce examination held at NPR College of Engineering & Technology in Natham on_____.

INTERNAL EXAMINAR

EXTERNAL EXAMINAR

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ii

ABSTRACT

The Large deployment of Internet of Things is permitting Smart City projects all over the world. The massive organization of Internet of Things is allowing Smart City activities and everywhere throughout the world. The services are transforming cities by improving waste management, saving water and improving the quality of human life. In this proposed system, using IOT with Extended Ports integrating the smart city prototype. As we are developing the Smart water Tank and Smart Garbage System. The main advantages of the proposed architecture and how it is benefits in the city. The goal is to improve the water utilization to high with minimal water waste and to keep clean and hygiene city with smart waste box management system. This proposed system is develops with automated system with location tracker, transmitting alert, and monitoring through IOT system
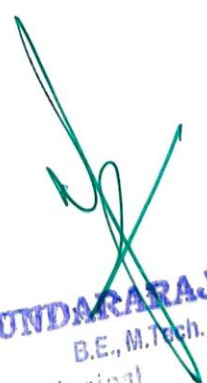
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CHAPTER-8
CONCLUSIONS

In our proposed system, water quality monitoring and water level in tank as well as it also include to monitoring the smart waste box management. The proposed system is created with the use of different sensors, microcontroller ATMEGA 328p as controller and Cloud for storing the data from microcontroller and sending the command to controller for measuring water quality, water level and waste box management. The generated data can be viewed using web interface all over the city. The advantage of the system is to provide the adequate water supply with good quality water to each house, industry, and keep city clean with smart box management.

EC8811	PROJECT WORK	L T P C
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OBJECTIVES:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is   required at the end of the semester.   The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 300 PERIODS

OUTCOME:

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

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DESIGN OF TIRE PRESSURE MONITORING SYSTEM WITH VEHICLE TO VEHICLE COMMUNICATION

A PROJECT REPORT

Submitted by

MANOJ PRABHAKAR.V	**(920818106014)**
MUTHU VIGNESH.M	**(920818106017)**
VIGNESH.R	**(920818106036)**

in partial fulfillment for the award of the

degree of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

NPR COLLEGE OF ENGINEERING AND TECHNOLOGY

NATHAM, DINDIGUL.

i

ANNA UNIVERSITY:: CHENNAI 600 025
BONAFIDE CERTIFICATE

Certified that this project report **"Design of tire pressure monitoring system with vehicle to vehicle communication"** is the Bonafide work of **"MANOJ PRABHAKAR.V (920818106014), MUTHU VIGNESH.M (920818106017), VIGNESH.R (920818106036)"** who carried out the project work under my supervision.

SIGNATURE

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Submitted for the project viva-voce examination held at NPR College of Engineering and Technology in Natham on_____.

INTERNAL EXAMINER

EXTERNAL EXAMINER

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11

58

ABSTRACT

A V2V communication technology can increase the performance of vehicle safety systems and help save lives. There were 5.6 million police-reported motor vehicle crashes in 2015, and the number of fatalities from police-reported motor vehicle crashes continues to rise. Legal regulations of road safety require that each vehicle is equipped with active and passive safety systems such as ABS, ESP, AB, etc. Requirements for brake systems of cars were formulated in Regulations of 13 UN Economic Commission for Europe (ECE). Tires provide the only contact of the vehicle with the substrate; whether a vehicle can maintain direction of motion, or whether it can stop before the barrier depends on them. This project proposes vehicle to vehicle communication with the alert of tire pressure level and accident indication .The proposed system includes arduino controller ,tire pressure sensor, blue tooth communication with GSM and GPS modules. Experimental results verify the efficient of proposed system.

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Chapter 7

7. CONCLUSION

Vehicle communication system makes better fleet management and which in turn brings large profits. Better scheduling or route planning can enable you handle larger jobs loads within a particular time. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming year, it is going to play a major role in our day-to-day living. Main motto of the accident alert system project is to decrease the chances of losing life in such accident which we can't stop from occurring. Whenever accident is alerted the paramedics are reached to the particular location to increase the chances of life. This device invention is much more useful for the accidents occurred in deserted places and midnights. This vehicle tracking and accident alert feature plays much more important role in day to day life in future.