DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TWENTY FOURTH DEPARTMENTAL CONSULTATIVE COMMITTEE MEETING

DATE	10.11.2020
TIME	3.00 P.M
VENUE	CONFERENCE HALL DEPARTMENT OF ECE

AGENDA

ANNA UNIVERSITY CHENNAI

CHENNAI – 600025

Dr. M. Meenakshi,
Professor and HoD

Date: 09.11.2020

CIRCULAR

The Twenty Fourth Departmental Consultative Committee (DCC) Meeting is scheduled to be held at 3.00 P.M on 10.11.2020 in the Conference Hall, Department of Electronics and Communication Engineering.

Kindly make it convenient to attend the meeting without fail and contribute your valuable suggestions regarding the following agenda items.

Items No.	Description
24.01.01	Approval for Industrial Internship and Transfer of Credits

9/11/2020.

Head

Dept. of ECE

To

The Committee Members of DCC:

1. Dr. Dr.Ranjani Parthasarathy, Chairperson, Faculty of ICE
2. Dr.S.Chandramohan, Prof & Head, DEEE
3. Dr.M.A. Bhagyaveni, Professor
4. Dr.D.Sridharan, Professor
5. Mrs.N.Vijaya, Asso. Professor
6. Dr. S.Poonguzhali, Asso. Professor
7. Dr.T.Laxmikandan, Asst. Professor
8. Dr.Arul Siromoney, Professor, DCSE

Date : 10.11.2020   Venue : Conference Hall

Time : 3.00 p.m.   Department of ECE

AGENDA

Item No.	Description	Page No.
24.01.01	Approval for Industrial Internship and Transfer of Credits	

Minutes of the Twenty Fourth Departmental Consultative Committee meeting of the Department of Electronics and Communication Engineering held on 10.11.2020 at 3.00 pm in the Conference Hall, Department of Electronics and Communication Engineering.

The Twenty Fourth Departmental Consultative Committee meeting of Department of Electronics and Communication Engineering was held on 10.11.2020 at 3.00 PM in the Conference Hall, Dept. of ECE.

The following members were present during the meeting.

Internal Members:

1	Dr. M.Meenakshi	Convener of DCC
2	Dr. D. Sridharan	Member
3	Dr.M.A.Bhagyaveni	Member
4	Mrs. N. Vijaya	Member
5	Dr.S. Poonguzhali	Member
6	Dr. T. Laxmikandan	Member

External Members :

|		
1.	Dr. Ranjani Parthasarathi	Chairperson, Faculty of ICE
2.	Dr. Arul Siromoney	Member
3.	Dr. S. Chandramohan	Member

Item No. 24.01.01   Approval for Industrial Internship and transfer of credits

The following student of Department of Electronics and Communication Engineering has undergone 8 weeks Industrial Internship at Mathworks India Pvt. Ltd. with the details given below. The student has requested for dropping a professional elective in lieu of the internship undertaken.
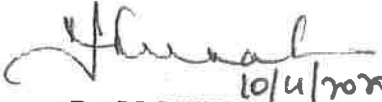
Name & Roll No. of the student	:	DARSHAN V, 2017105521
Degree & Regulation	:	B.E. ECE - R 2015
Name of the Industry	:	MATHWORKS INDIA PVT. LTD.
Where Internship undertaken		
Duration of the Internship	:	18-05-2020 to 10-07-2020 (8 Weeks)

The following committee was constituted to evaluate the student's internship for transfer of credits.

1. Mr. S. Prasad, Scientist E, SAMEER, Chennai (Industrial Expert)
2. Dr. T. Laxmikandan, Associate Professor, DECE, Convener
3. Dr. K. Gunaseelan, Assistant Professor (Sl.Gr), DECE
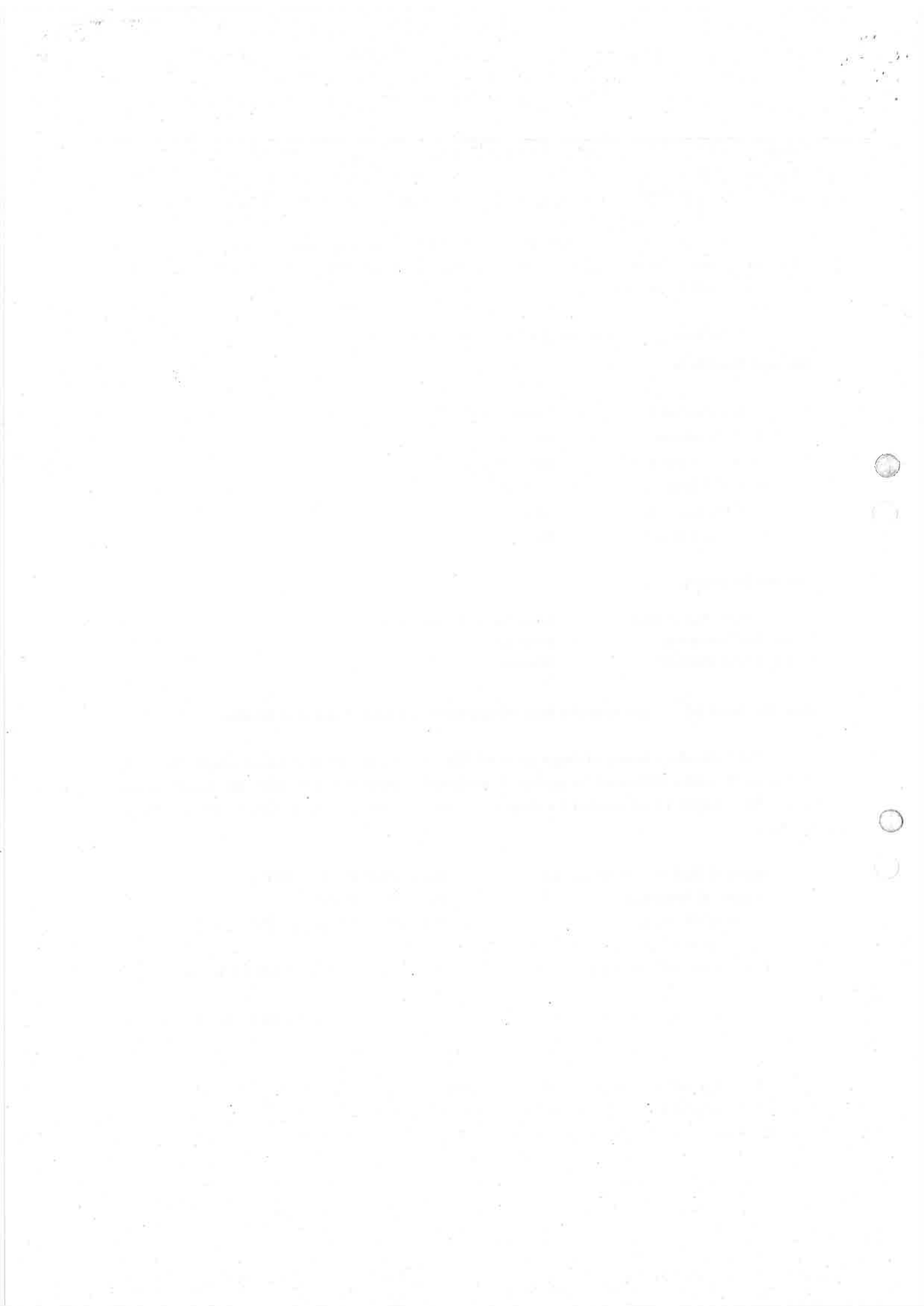
The committee conducted the Viva-Voce examination on 9.11.2020 2.00 PM by online mode and awarded marks. Based on the report submitted by the student on their internship, the certificate issued by the organization and the Viva-Voce performance, the DCC approves the transfer of credit and dropping of the professional elective as requested by the student.

Dr. M. MEENAKSHI
CONVENER

Dr. D. SRIDHARAN
MEMBER

Dr. M.A. BHAGYAVENI
MEMBER

Mrs. N. VIJAYA
MEMBER

Dr. S. POONGUZHALI
MEMBER

Dr. T.LAXMIKANDAN
MEMBER

Dr. ARUL SIROMONEY
MEMBER

Dr. S. CHANDRAMOHAN
MEMBER

Dr.RANJANI PARTHASARATHY
CHAIRPERSON
FACULTY OF ICE, AU
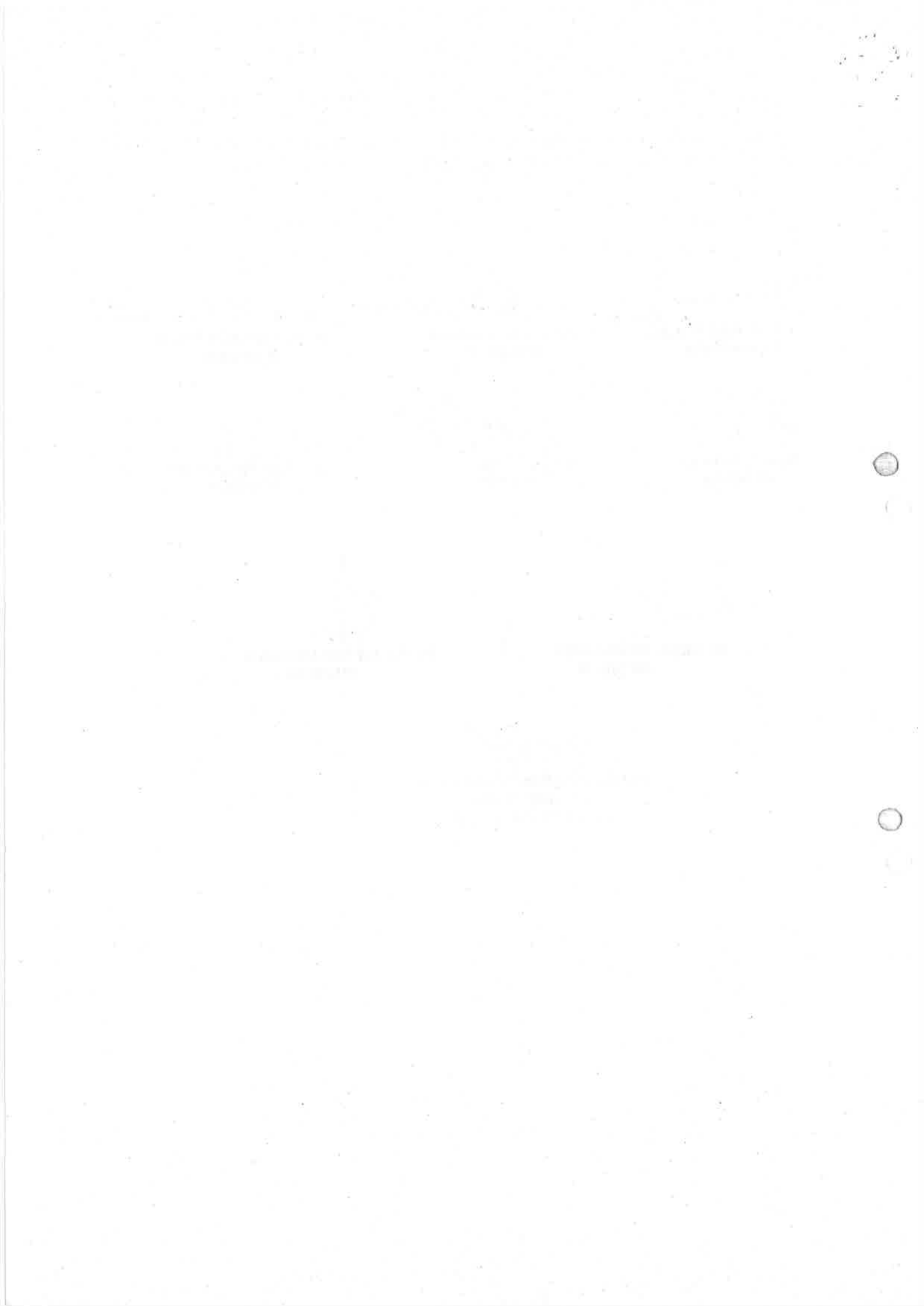
CENTRE FOR ACADEMIC COURSES
ANNA UNIVERSITY, CHENNAI – 600 025.
APPLICATION FOR DROPPING ONE PROFESSIONAL ELECTIVE SUBJECT AGAINST COMPLETION OF INTERNSHIP / INDUSTRIAL TRAINING STUDENT

Name	Darshan V
Roll No / Register Number	2017105521
Degree Programme	B.E
Semester	7
Department	Electronics and Communication Engineering
Is it part of the Curriculum ?	YES / NO : No SEMESTER :
Name of the Organization Offering Internship / Industrial Training	MathWorks India Pvt. Limited
Government / Government Aided / Research Lab / Private (Please Indicate)	Private
Area of proposed work during internship / Industrial Training	Software development
Duration (With date)	8 Weeks : From 18-05-20 To 10-07-20
Mobile Number	9087656769
Professional Elective to be dropped : Subject Code & Subject Name (Submit within 15 days of commencement of semester immediately after return from internship / industrial training)	EC7021 Wireless Communication Networks
Enclosure : i. DCC Minutes ii. Internship Certificate	YES / NO : Yes YES / NO : Yes

K. Uday 21/10/20

Faculty Advisor
(with date)

V. Darshan
21/10/20

Signature of the Student
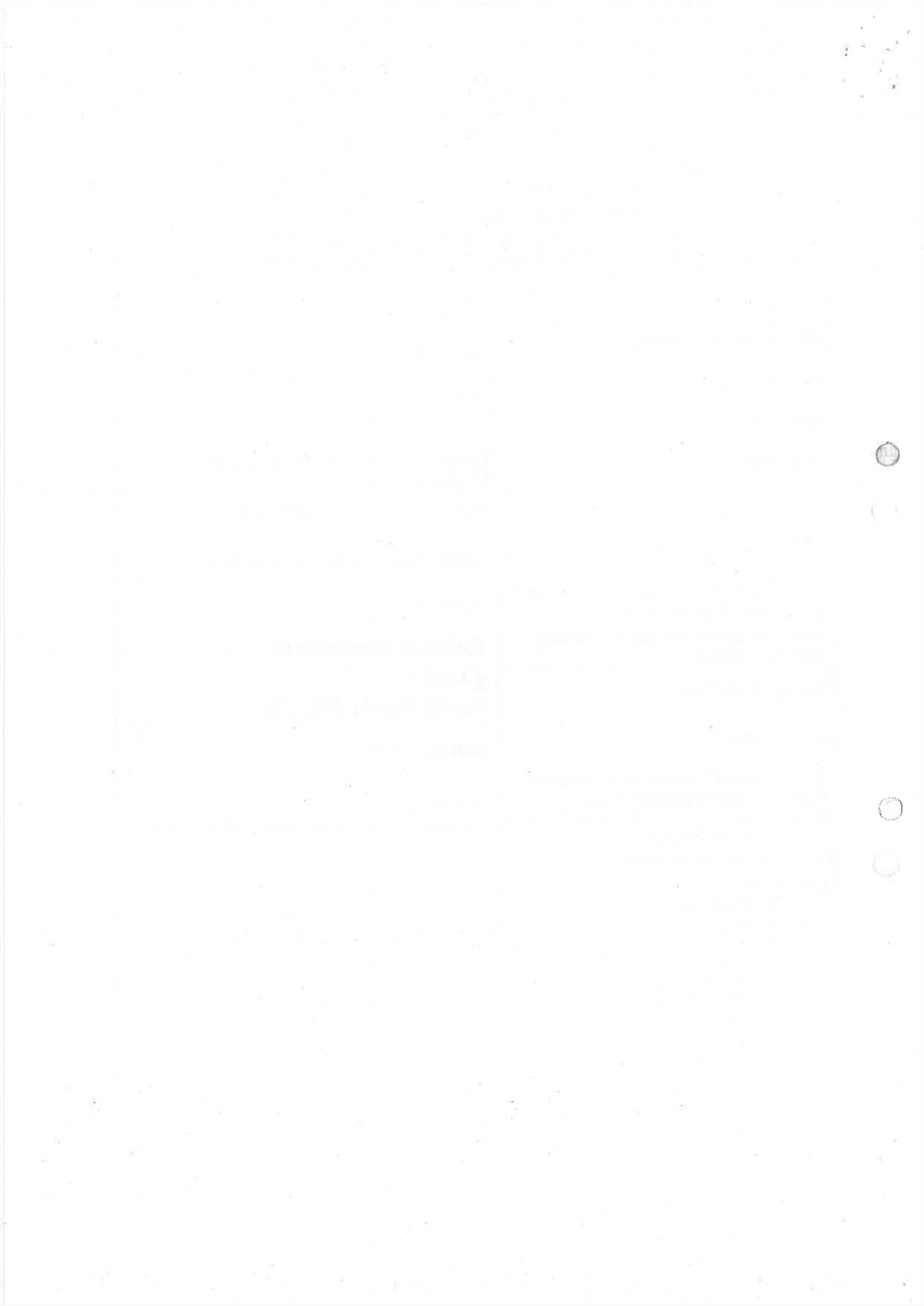**(with date)**

Recommended and Forwarded

Uma 10/4/202

Signature of HOD
(with date)

DIRECTOR (AC)

Copy to:
1. The Additional Controller of Examinations, Anna University, Chennai – 25.
2. The Candidate concerned – Through the HOD
3. The Stock File CAC.
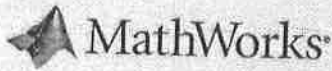
MathWorks®

July 10, 2020

TO WHOMSOEVER IT MAY CONCERN

Mr. Darshan V has successfully completed his Internship with the Engineering Development Group at MathWorks India Private Limited from May 18, 2020 to July 10, 2020.

We wish him success in his future endeavors.

For MathWorks India Pvt. Ltd.,

Supreetha Suvarna
Sr. HR Business Partner

APPLICATION FOR INTERNSHIP / INDUSTRIAL TRAINING

Name	Darshan V
Roll No / Register Number	2017105521
Degree Programme	B.E.
Semester	7
Department	Electronics and Communication Engineering
It is part of the Curriculum	YES / NO : No SEMESTER :
Name of the Organization	MathWorks India Pvt Limited
Address	9th Floor, B wing, Etamin Block, Prestige Technology park II, Marathahalli -Sarjapur Ring road, Bengaluru , Karnataka 560103
Government / Government Aided / Research Lab / Private (Please Indicate)	Private
Area of proposed work during internship	Software development
Duration (With date)	8 weeks (18-05-20 to 10-07-20)
Mobile Number / E-mail ID	9087656769 / vdarshan4@gmail.com
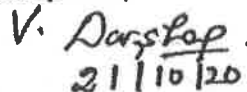
The Following should be enclosed

  I. **Internship Call Letter**
 II. **Declaration by Parent (Annexure)**

Undertaking

I hereby agree that I would ensure that I earn the required Attendance (75%) as per the Regulations. (Only if the Internship period overlaps with the next semester period)

K. Uday 21/10/20
Faculty Advisor
(with date)

V. Darshan
21 | 10 |20
Signature of the Student
(with date)

Recommended and Forwarded

Signature of HOD 27|10|2020
(with date)
FORWARDED

HEAD

ANNEXURE

DECLARATION BY PARENTS

I, _____Vijayaraghavan N_____ F/O or ~~M/O~~ _____Darshan V_____

studying _____B.E. E.C.E._____ hereby_____shall_____

permit my son / ~~daughter~~ to undertake the _____Internship at MathWorks_____ .

I understand that the travel by rail / road / Airways and the stay outside the limits of the

campus may involve risk of physical harm, under unexpected circumstances. I assure

that my son / ~~daughter~~ is responsible for his behavior during the internship and I will

neither blame the Institution nor demand compensation for the same for the results of

any untoward incidents.

Thanking you,

Yours faithfully,

N.Q

21|10|20

MathWorks®

February 13, 2020

Darshan V
Anna University, Guindy,
Chennai Tamil Nadu 600025

Dear Darshan:

We are pleased to confirm our verbal offer for the position of Intern in Engineering Development Group.

During the weeks prior to your start date, you will receive two emails from Workday (our Human Resource system), with your username and temporary password. Please login and follow the instructions under "Getting Started at MathWorks", to complete a number of essential steps prior to your first day.

We look forward to welcoming you to The MathWorks and trust that you will find your internship both challenging and rewarding. We anticipate that you will start on May 18, 2020. Please respond by March 11, 2020 and indicate your acceptance by signing this Cover Letter, the Contract of Employment and Annexure, using Adobe sign. Please also complete the enclosed Name and Personal Email Request Form.

Sincerely,

Kumar Bakthavatchalu,
Finance and Operations Controller, India

Written Signature for the Company | Date

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darshan v
darshan v (May 14, 2020 15:22 GMT+5.5)   May 14, 2020

Electronic Signature by the Employee | Date

Written Signature by the Employee | Date

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COLLEGE OF ENGINEERING, GUINDY CAMPUS
ANNA UNIVERSITY :: CHENNAI

INTERNSHIP / INDUSTRIAL TRAINING EVALUATION - OCTOBER 2020

Sl.No	Name	Roll No	Degree / Branch	Sem / Batch	Title of the Project	Marks			Total (100 Marks)	Examiner
						Report (40 Marks)	Presentation (30 Marks)	Viva Voce (30 Marks)		
1	Darshan V	2017105521	B.E.-ECE	VII	TCP/IP Test Utility and Automated tests.	35	25	22	82	Mr. S. Prasad
						35	25	25	85	Dr. T. Laxmikandan
						35	26	25	86	Dr. K Gunaseelan
					Average				84	

Dr. T. Laxmikandan 09/11/2020

Dr. K Gunaseelan 09/11/20

9/4/2020

HOD
Dept. of ECE
College of Engineering
Anna University, Chennai-25.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COLLEGE OF ENGINEERING, GUINDY CAMPUS
ANNA UNIVERSITY :: CHENNAI

INTERNSHIP / INDUSTRIAL TRAINING EVALUATION - OCTOBER 2020

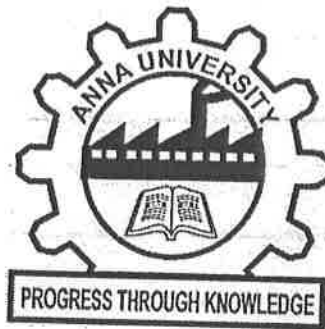| Sl.No	Name	Roll No	Degree / Branch	Sem / Batch	Title of the Project	Industry Expert			Total (100 Marks)
						Report (40 Marks)	Presentation (30 Marks)	Viva Voce (30 Marks)	
1	Darshan V	2017105521	B.E.-ECE	VII	TCP/IP Test Utility and Automated tests.	35	25	22	82
2									
3									
4									

Mr.S.Prasad
Scientist - E
SAMEER-CEM

Received
via email

9/11/20

HOD
Dept. of ECE
College of Engineering
Anna University, Chennai-25.

ANNA UNIVERSITY

COLLEGE OF ENGINEERING GUINDY

INTERNSHIP REPORT

Name : Darshan V

Reg No : 2017105521

Department : Electronics & Communication Engineering

Providing Organization : MathWorks India Private Ltd.

Contents

About the Organization

MathWorks is an American privately held corporation that specializes in mathematical computing software. The company's key product, MATLAB, was created in the 1970s by Cleve Moler. It was a free tool for academics. Jack Little and Cleve Moler founded MathWorks in 1984.

By 1997, MathWorks was profitable, claiming revenue of around $50 million, and had around 380 employees. In 1999, MathWorks relocated to the Apple Hill office complex in Natick, Massachusetts. By 2018, the company had around 3,000 employees in Natick and said it had revenues of around $900 million.

The company's two lead products are MATLAB, which provides an environment for programmers to analyze and visualize data and develop algorithms and Simulink, a graphical and simulation environment for model-based design of dynamic systems.

MATLAB and SimuLink are used in aerospace, automotive, software and other fields. The company's other products include Polyspace, SimEvents and Stateflow.

Presence in India

MathWorks has four offices throughout India - in Bangalore, Hyderabad, New Delhi and Pune. New Delhi and Pune offices mainly focus only on customer service support whereas Bangalore and Hyderabad offices focus on both product development as well as customer service support. I did my internship at MathWorks India Private Ltd., Bangalore.

Introduction

The internship at MathWorks India Private Ltd. Bangalore gave me a great learning experience and an understanding of how the corporate world works. The duration of the internship was 8 weeks (May 2020 - July 2020). Due to the current scenario (COVID-19), the internship was conducted remotely and MathWorks did a great job at organizing it as smoothly as possible. I was a part of the Engineering Development Group (EDG) and the role of an EDGer is to engage in both product development as well as customer service support.

Every intern will be assigned a buddy, a manager, a project mentor and a project sponsor. They were our key stakeholders to whom we had to update our internship progress periodically. My buddy helped me with the onboarding process. I was assigned with a project from Embedded targets team. I was assigned to a project based on building a TCP/IP utility and performing automated testing. My project mentor helped me understand my role in the project and he constantly supported me throughout the internship. There were daily meetings with our mentor to decide on what to do next and how to proceed further. We were asked to talk to the Project Sponsor on a weekly basis to tell him about our progress.

The internship was not only about the project; there were also many other activities like Bin Scan Meetings (BSMs) in which they explain how to handle the customer service cases, Knowledge Sharing Meetings (KSMs) where we can share our knowledge with other EDGers, participating in the Company Wide Bash to find bugs in MathWorks products before deployment which will be useful for the developers to remove those bugs in the next release, hackathon etc.

This report is a concise description of my internship experience and the progress of my learning curve in the project at MathWorks India.

Objectives

As an intern, the following responsibilities were bestowed upon me :

- Experience the work culture, vision, mission and goals of the company and make sure that the project done contributes to the Organization.
- Expand network of professional relationships and contacts.
- To work as a member of a team towards completing the task in hand.
- To complete the intern workbook activities
- To complete checklists related to the products that MathWorks used.
- To get familiar with their products - MATLAB and Simulink

Project

The project was based on creating a utility that can be used internally by MathWorks employees for creating TCP/IP connections and perform data transmission easily.

The process involves creating a utility that is optimized and that is compatible with various Simulink blocks during Automated tests. Further the utility should also be able to produce the desired output with different Target devices such as Arduino boards, C2000 family STM32 boards etc.

Motivation

1. To remove Java Socket programming in Internal Test Files

- Java was used to create TCP/IP connections while testing various Simulink blocks earlier. The company was undergoing a transition from Java and also wanted a clean utility that has the same functionalities.

2. Modify the existing test files to make it purely based on MATLAB

- To create clean test files purely based on MATLAB and to avoid importing different header files for different programming languages.

Problem Statement

Understanding TCP communication protocol for target to host communication. Exploring TCP/IP interfaces available with MATLAB and SIMULINK . Creating tester utility to validate Transmission and Reception workflow between host and Target. Test automation in BaT and verifying data transmission between different host and various targets(STM32 family, RaspPi and Arduino boards)

Implementation and Workflow:

Initial considerations for building the Utility :

The Two softwares that were considered initially were,

- MATLAB.
- Simulink.

Both MATLAB and Simulink had the functions and blocks required for the implementation of the utility. But Simulink had major compatibility issues with the existing test files. It will be a tedious process to include a Simulink model in an Automated test file. Further it will require the developer to entirely write new test scripts scrapping away the existing code. Simulink requires a model to be built and deployed on a different target board, which significantly increases the amount of time taken and also wastage of resources. On the other hand, Functions in MATLAB was compatible with the existing test files which requires very minor changes. So, MATLAB was considered for building the utility.

Object Oriented Programming in MATLAB:

The utility was written as a MATLAB class. To understand the automated test files, one must be familiar with Object Oriented Programming in MATLAB.

The first step was to learn about OOPS in MATLAB. Later I learnt how to write function-based tests and unit tests in MATLAB.

Major functions of the Utility:

The TCP/IP utility that's built performs the following functions:

- Create a TCP/IP Server / Client socket object.
- Open the connection for the TCP/IP object.
- Transmission of all types of data using the object.
- Receiving all types of data using the object.
- Transmitting matrices to targets.
- Ensuring if the target is connected with the host at any point of time.
- Change the different parameters of a TCP/IP function like IP, Port etc. of the already existing objects.
- Close the TCP/IP connection.

Apart from the above mentioned the Utility also allows the developer to view the number of bytes available in the buffer, read write timeout, last received value, if the connection is established or not, Local Port, Local Host and the number of bytes of data sent.

Testing the Utility:

Single Port:

The Utility was tested first with a TCP server and client of its own type. Data to be sent and received was verified. Every time the packet flow must be verified using Wireshark. Hercules software was used to create a TCP/IP Server/Client in a Virtual adaptor network. The Utility object was then tested with the virtual TCP/IP server/client. The data transmission of different types was tested. Different other functions of the utility were tested if it works properly.

Multi-Port functionality:

Multiport functionality is tested by establishing multiple servers and clients TCP/IP connections in the same time with different port numbers and verifying there is no cross talk between different pairs of the servers and clients. To test this multiple instances of Hercules is created (both servers and clients) with different port numbers and respective Utility objects are made to establish connection with the virtual servers and clients. Later data is sent simultaneously on different ports and are verified if the data is received on the corresponding Server/Client as expected.

Testing it on a Real Target – Raspberry pi:

The next step was to test if the utility was compatible with a real target, for which a server is created using the utility and a Simulink model is built and deployed on the Raspberry pi in external mode (gives us the flexibility to change the input once the model is executed on the target). The data transmission is verified and it is confirmed that there is no crosstalk with multiple servers and clients.

Building Simulink model using MATLAB commands:

In Automated test for checking the targets the model must be created when we execute the MATLAB test file. For this the Simulink model that is to be deployed in the target has to be created using MATLAB commands. The process of building the models using MATLAB commands involves,

- Selecting the required blocks
- Positioning the required blocks
- Connecting the blocks in the required manner
- Modifying the model configuration to connect with the Target
- Configure the model to execute in external mode
- Deploying the model

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- Changing the values that is being sent or received after the deployments of the model

Modifying existing test files and writing new test files:

The Existing test files were modified to remove JAVA Socket programming. Tests were done to ensure if it works properly. Later we decided to write four new Automated test files for Raspberry pi client send , client receive , server send , server receive. These were then tested manually once using the Raspberry pi target and later was put as a Qual Job in the BaT (Build and test) cave.

The BaT cave is used by developers to perform automated tests. Basically, the BaT cave tests the same file in different operating systems such as MacOS, Windows and Linux and also in different MATLAB versions that support currently. The BaT also has a number of hardware boards as its resources so all types of tests such as those involving the hardware can also be tested in BaT cave.

Project Roadmap

TCPIP	MATLAB OOPS and unittests	Wireshark and Hercules
• Deep dive into how TCP works.	• Got to know how to build classes with MATLAB and learnt how to write unittests.	• Worked with Hercules and wireshark to see TCP/IP protocol in action.

Exploring alternatives to build the utility	Building the Utility	Testing the Utility with Raspi
• Had MATLAB and Simulink as options.Settled with MATLAB due to the ease of use.	• Built the Class that could perform all possible functions with respect to TCP communication and tested them extensively for all possible datatypes and sizes with hercules while confirming the flow of packets with wireshark.	• Tested the class with Raspberry pi and polishing the class to meet the expected behaviour.

Refining the Code and using the class	Writing Tests from scratch	Documentation
• The code went through three levels of refining in review board. Later used the utility to remove java code from already exsisting test files.	• Wrote 4 test files for host to target communication using Raspi simulink blocks and the utility and tested it in BaT.	• Documented the work explaining the different properties ,methods and their behaviour. • Mentioned examples on how to use the utility.

The above Roadmap gives an idea on how the project progressed step by step. It was well structured and helped me to complete my project easily.

Project Review

A review board was maintained for every task. A task here denotes the utility, the altered test files and the newly written test files. Whenever I post any new code on the review board all my stakeholders(Project mentor and sponsors) are notified. If they find any improvement or find any code that must be modified, comments are given at those specific spots.

Once the changes are made we can commit those changes and again the process continues until our mentors and project sponsors are satisfied. After getting the approval from both the code can now be put as a Qual Job in the BaT cave. If it passes the automated test then the code is submitted to the development cluster who take care of deployment.

Contributions

During the project tenure I completed the below mentioned tasks. All of them were reviewed, verified and tested properly. The Embedded Targets team started using the utility a week after I completed it. Other test files also were submitted for further processing.

The following are the tasks that I completed during my internship period :

S No.	Tasks	Description
1	TCP/IP Utility – Performs all the TCP/IP related functions	• Internally used by MathWorks Staffs. • The code undergone 3 levels of refining in the review board. • Separate documentation was done and examples were given on every function for ease of use.
2	Existing Test Files modified – The utility was used to remove Java from existing test files	• 4 files in total • The test files belonged to the STM32 boards.
3	New Test files written – These test files were written for Raspberry Pi boards since they did not exist before	• 4 files in total • The test files check if the host and the target(Raspberry Pi board) can communicate with TCP/IP protocol. They are, • TCPIPRaspClientSend • TCPIPRaspClientReceive • TCPIPRaspServerSend • TCPIPRaspServerReceive

Company Wide Bashing

Companywide bashing is an event that spans for about one month. During this event every MathWorker across the globe come together to Bash on the upcoming features and functions that will be released in the future versions of MATLAB. The employees formed groups among themselves and points were given for each bug they find. A bug was given 5 points, An Enhancement suggestion was given 3 points. The team that won the competition was given many prizes.

Once we find a bug we can gcck it which notifies the developer of that function or feature who will further investigate on it. In this event I was able to find 3 bugs and also posted gecks in them.

Hackathon

One of the most interesting and fun activities of the internship was the Hackathon event. A group of 5-7 interns were teamed together and the challenge was to come up with an idea that could be useful to MathWorks by making use of their products (MATLAB , SimuLink etc.). My team consisted of 7 members from different colleges across India.

Team Name   :   NoFoodNoHack
Project Title   :   Denoiser

Problem Statement

In the scenario of remote working, we had our meetings and discussions on Microsoft Teams. It was very common that the speech clarity of attendees of the meeting was not clear and was hampered by background noises due to bad internet connectivity, wrong positioning of the mic, external noises etc. Our idea was to

reduce the background noises and improve the sound quality in the recorded versions of the meetings.
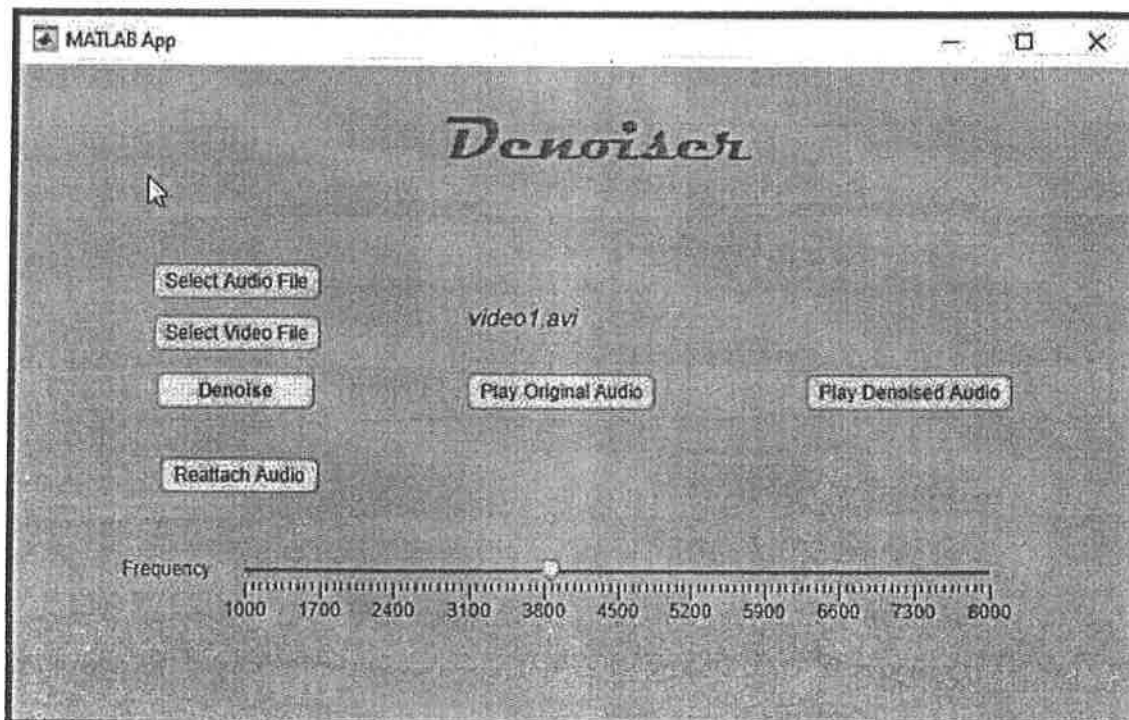
Architecture
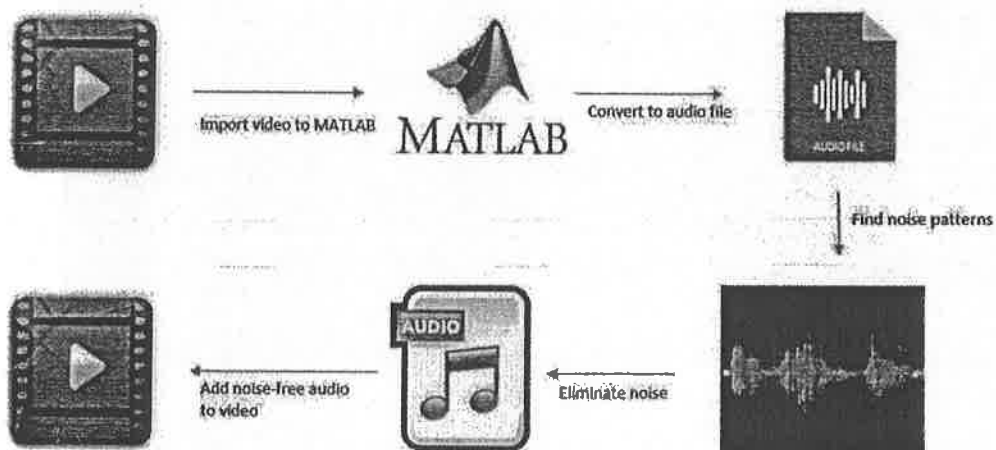
Approach

There are 4 main steps :

1. Extracting the audio separately from the video using MATLAB .
2. Finding a noise pattern in the signal.
3. Filter out the noise signal from the original audio and the output will be noise-free audio.
4. Attaching the noise-free audio to the video back.

DENOISER

As a team of 8, we worked on de-noising TEAMS recordings. We built the application using MATLAB App Designer. Upon selecting any video/audio file on TEAMS, the respective de-noised file is generated as the output. We also added a facility to make custom adjustment to get the desired output. I believe, we did a pretty good job as a team in designing the application with the proposed functionalities. The experience had taught me on how to be a good team player to work for a better growth. The lessons that I have learnt from the hackathon are listed below:

•Sticking with one particular problem for a long time can prove to be costly – time and energy

•Work with varied test cases - Our initial test sample was very difficult to work with.

•Improve and modify the workflow with the course of time.

•Form small groups of 2 to 3 in the team to work on a particular problem. It can prove to be less time consuming and more efficient.

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