

5th Board of Studies Meeting in the Department of Electronics & Communication Engineering

Mode: Through Online (Meeting Link:

<https://zoom.us/j/91794609757?pwd=VXhldVkyS21GTXRFeCs4Q3Zydy9TQT09>)

Date & Time: 1st July 2021 at 10a.m

AGENDA

BoS / ECE 5.1: Welcome address and Opening Remarks by Chairman, Board of studies in the Department of ECE

BoS / ECE 5.2: Confirmation of the Minutes of the 4th meeting of Board of studies in the department of Electronics & Communication Engineering held on 12th January, 2021

BoS / ECE 5.3: Business brought forward by the Chairman, Board of Studies, which is
5.3.1 NPTEL courses for students following Regulation 2019- 5th Semester

5.3.2 Specialization/ Minor courses for Regulation 2019

5.3.3 Curriculum of 8 semesters & Syllabi of Semesters I,II for UG - B.E Electronics &
Communications Engineering - for Regulations 2021

5.3.4 Curriculum & Syllabi of PG - M.E VLSI Design for Regulations 2021

5.3.5 Curriculum & Syllabi of PG -M.E Communications Systems for Regulations 2021

BoS / ECE 5.4: Other suggestions given by the BOS Members

Department of Electronics & Communication Engineering
MINUTES OF THE MEETING

The 5th Meeting of the Board of studies of the Electronics & Communication Engineering was held on 1st July 2021 at 10a.m through online.

The following members were present:

S. No	Members as per UGC Norms	Members Nominated
1	Head of the Department concerned (Chairman)	Mrs.J.Friska, Head & Asso. Prof, ECE department
2	One Expert nominated by the Vice Chancellor from a panel of six recommended by the college Principal	Dr.G.Karpagarajesh Associate Professor, Department of Electronics and Communication Engineering, Government College of Engineering Tirunelveli
3	Two experts in the subject from outside the college nominated by the Academic Council	Dr.S.Anand Associate Professor Department of Communication Engineering School Of Electronics Engineering (Sense)VIT-Vellore
		Dr. P. Sivakumar Professor, Department of Electronics and Communication Engineering, Kalasalingam University, Krishnankoil-626126. Virudhunagar , Tamil Nadu, India.
4	One representative from industry/corporate sector/allied area relating to placement	Er.Francy Williams Senior Engineer, All India Radio , Palayamkottai, Tirunelveli
5	One Post Graduate meritorious aluminous nominated by the Principal	Er.S.J. Jinolin Jacob HR manager, US Operations Insigma Technologies Pvt Ltd Trivandrum

6. Internal Members Present:

S. No	Name of the Member	Designation
1	Dr. N. MuthuKumaran	Asso. Prof/ECE
2	Dr.Subbulakshmi Nammalwar	Asso Prof/ECE
3	Mrs.M.NavaneethaVelammal	Asso. Prof/ECE
4	Mr.C.AmarsinghFeroz	Asso. Prof./ECE

5	Dr.K.Lakshmi Narayanan	Asst. Prof/ECE
6	Dr.R.Kabilan	Asst. Prof/ECE
7	Dr.Andrew Roobert	Asst. Prof/ECE
8	Mr.S.Esakki Rajavel	Asst. Prof/ECE
9	Mrs.M. Chitra Evangelln Christina	Asst. Prof/ECE
10	Mr. P. Kannan	Asst. Prof/ECE
11	Mr.M.Suresh Chinna Thampy	Asst. Prof/ECE
12	Mr.S.Allwin Devaraj	Asst. Prof/ECE
13	Mrs.E.Francy Irudaya Rani	Asst. Prof/ECE
14	Mr.G.Jayaraman	Asst. Prof/ECE
15	Mr.R.Prem Ananth	Asst. Prof/ECE
16	Mr.B.Pradheep T Rajan	Asst. Prof/ECE
17	Mrs.R.Niranjana	Asst. Prof/ECE
18	Ms.N.Renee Segrid Reddiyar	Asst. Prof/ECE
19	Mr.Santiago Stephen	Asst Prof/Maths

Ex-Officio members present:

S. No	EX OFFICIO MEMBERS	
1	Dr.V.Velmurugan	Principal, Francis Xavier Engineering College, TVL
2	Dr.L.R.Priya, Asso.Prof, ECE Dept	Professor Academics, Francis Xavier Engineering College, Tirunelveli
3	Dr.G.Rajakumar, Prof, ECE Dept.	Controller of Examinations, Francis Xavier Engineering College, Tirunelveli
4	Dr.M.Caroline Viola Stella Mary	ERP Head, Francis Xavier Engineering College, Tirunelveli

Members Absent :

1	Mrs.D.Reggi Timna	Asst. Prof/ECE
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Reason:

On medical Leave

Board of Studies Meeting started with a prayer by Mr. Amarsingh Feroz, AP/ECE

BOS / ECE 5.1: WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN, BOARD OF STUDIES IN THE DEPARTMENT OF ECE

The Chairman, BOS of Electronics & Communication Engineering welcomed and introduced the members of 5th Board of Studies and thanked each of them for sparing their valuable time to attend the meeting.

BoS / ECE 5.2: CONFIRMATION OF THE MINUTES OF THE 4TH MEETING OF BOARD OF STUDIES IN THE DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING HELD ON 12TH JANUARY, 2021 AND ACTION TAKEN REPORT OF 4TH MEETING OF BOARD OF STUDIES

The minutes of the Fourth Board of Studies meeting held on 12th January, 2021 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by the 4th Academic Council Meeting.

Annexure I: Action Taken Report after presenting to Academic Council Meeting IV

BOS / ECE 5.3: BUSINESS BROUGHT FORWARD BY THE CHAIRMAN, BOARD OF STUDIES:

5.3.1 NPTEL COURSES FOR STUDENTS FOLLOWING REGULATION 2019 - 5TH SEMESTER

The list of online courses selected was shared and presented by the Chairman.

- suggested that credit equivalency for 8 weeks course and 12 weeks course must be displayed explicitly.
- Question was raised as to why only NPTEL/ SWAYAM courses were selected. The chairman resolved the issue, that only those courses have been selected to begin with, as they have a proper structure for content delivery and examination methods.

➤ RESOLVED TO APPROVE following for online courses

- ✓ **Displaying 3 credits** for 8 weeks course and **4 credits** for **12 weeks** course in the curriculum
- ✓ **List of courses were approved** by the members for Regulation 2019

Annexure II: List of online courses for regulation 2019 – semester 5 with grading of NPTEL scores.

5.3.2 SPECIALIZATION/ MINOR COURSES FOR REGULATION 2019

The list of minor courses was shared and explained by the Chairman.

- Suggested to Check with AICTE norms if minor courses can be offered in IOT by ECE department
- Question was raised if the same course content could be delivered as minor for other department and specialization course for ECE students.

➤ RESOLVED TO APPROVE following for specialization/minor courses

- ✓ The **list of specialization/ minor courses on IoT** was finalized.
- ✓ It is resolved to **frame the syllabus** for minor/specialization courses, **satisfying the prerequisites** for the content, beneficial to both intra and inter-department students.

Annexure III: List of specialization/ minor courses & their syllabi

5.3.3 CURRICULUM OF 8 SEMESTERS & SYLLABI OF SEMESTERS I,II FOR UG - B.E ELECTRONICS

& COMMUNICATIONS ENGINEERING - FOR REGULATIONS 2021

The chairman presented the newly framed 2021 regulation curriculum for 8 semesters and syllabi for Semester 1, 2.

The chairman presented to the members the major changes brought over in 2021 regulation curriculum compared to 2019 regulation curriculum.

- % change in curriculum is as below
 - ✓ Total no. of credits has been increased from 166 to 168
 - ✓ Under HSS, % Change in credits is 1.73, Under BS, % Change in credits is 2.56, Under ES, % Change in credits is 0.86, Under PC, % Change in credits is 3.15, Under PE, % Change in credits is 3.75, Under OE, % Change in credits is 0.09, Under EEC, % Change in credits is 2.28
- Included **theory, theory cum practical and also practical cum theory courses.**
- Increased **employability enhancement courses**
- Increased the **span of project work**, to give space **for innovational thinking**
- **Internship** is made compulsory.
- **2021 regulation curriculum** mainly aims at offering **trending concepts** in engineering core, while being aware of the **local and global development needs**, to make sure that the students are **industry ready**.
- ✓ In **Fundamental of electrical, electronics and communication** course of 1st semester,
 - **Transport equations** of diffusion, channeling – topics should be included
 - **Digital communication** also should be added
 - **Digital electronics** also should be added
 - **Ratio of number of units** for electronics and communication should be increased and reduced for electrical concepts.
- ✓ Basics and introduction of **Near field Communication & Millimeter wave communication** should be included in PE- 4G & 5G Networks
- ✓ Technologies like **public & hybrid blockchain** should be included in Blockchain Principles
- ✓ "Drones" or "**Unmanned Aerial vehicles**" can be included as one of the Professional electives
- ✓ Communication Network Principles can be renamed as "**Principles of communication networks**"
- ✓ **OFDM Systems** can be included as a topic under optical communication.
- ✓ **Free Space optics** should be included in Microwave and Optical Communication

- ✓ **Analog Electronic Circuits** can be **renamed** as it can be mistaken for linear integrated circuits
 - ✓ Problem Solving and Logical Thinking using C should include **company specific programs/problems like that of Wipro, TCS etc**
 - ✓ **Project work** in Semester 6 will be named as Project I - Phase I
Project work in Semester 7 will be named as Project I - Phase II
Project work in Semester 8 will be named as Project II
 - ✓ **Fourier Transform and Z Transform** should be included in Semester 3 under Probability & Numerical Techniques- Course will be revamped and renamed
 - ✓ **Broadband Access Technologies** will be included as a Professional Elective
 - ✓ Cross check the **continuity of streams** in Professional Electives.
 - ✓ **Replace Technical Seminar** in 5th & 6th Semester by **Internship** in 5th semester.
 - ✓ Industry support courses, value added courses, minor courses should also be included in the curriculum.
- **RESOLVED TO APPROVE** the above-mentioned suggestions for Curriculum and syllabi of Semester 1,2 - B.E Electronics & Communication engineering

5.3.4 CURRICULUM & SYLLABI OF PG -M.E VLSI DESIGN FOR REGULATIONS 2021

The chairman presented the newly framed 2021 regulation curriculum & syllabi for 4 semesters for M.E. VLSI Design

The BOS members gave the following suggestions

- ✓ Include a course on **Research methodology**
 - ✓ IC Design for Wireless Communication can be renamed as "**IC design for communications**"
 - ✓ **Hardware Description Languages** is not necessary-It will **be removed**.
 - ✓ **Digital System Design** will be revamped to include advanced concepts and will be renamed as Advanced Digital System Design.
 - ✓ **Digital System Design Laboratory** will be revamped to include advanced tools and will be renamed as Advanced Digital System Design Laboratory.
 - ✓ **ASIC System Design** will be replaced by **3D IC Design**
 - ✓ To avoid repetition in Nano-Electronic Devices and Materials and Fundamentals of Nanoelectronics, important contents of both will be combined as a single course named "**Nano-Electronic Devices and Materials**"
 - ✓ "**Flexible electronics**" can be included to **replace Fundamentals of Nanoelectronics**
 - ✓ "**Scripting language**" can be included to **replace Device modeling**
- **RESOLVED TO APPROVE** the above-mentioned suggestions for Curriculum and syllabi of PG Programme - M.E. VLSI Design

5.3.5 CURRICULUM & SYLLABI OF PG - M.E COMMUNICATIONS SYSTEMS FOR REGULATIONS 2021

The chairman presented the newly framed 2021 regulation curriculum & syllabi for 4 semesters for M.E. Communication Systems.

The BOS members gave the following suggestions

- ✓ Include a course on **Research methodology**
- ✓ **"Underwater communication"** will be added as one of the electives.
- ✓ **"Advanced Digital Communication Techniques"** will be included instead of **Microwave Integrated Circuits in Semester I**
- ✓ Most courses under M.E.CS - are named with prefix **"Advanced"**. They will be renamed as **Modern or Trending** etc.
- ✓ Outdated processor content will be revamped in **"DSP Processor Architecture and Programming"**
- ✓ **Topic LIDAR** can be included in **"Advanced Radar and Navigational AIDS"**

➤ **RESOLVED TO APPROVE** the above-mentioned suggestions for Curriculum and syllabi of PG Programme - M.E. Communication Systems

BoS / ECE 5.4: OTHER SUGGESTIONS GIVEN BY THE BOS MEMBERS

- ✓ Can also consider 4-week online courses.
- ✓ Include more of professional electives on emerging areas.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

- **RESOLVED TO APPROVE** online courses for Regulation 2019 semester 5
- **RESOLVED TO APPROVE** specialization/minor courses for Regulation 2019
- **RESOLVED TO APPROVE** the Curriculum for 4 semesters and syllabi of Semester 1,2 - B.E Electronics & Communication engineering
- **RESOLVED TO APPROVE** the Curriculum and syllabi of PG Programme - M.E. VLSI Design
- **RESOLVED TO APPROVE** the Curriculum and syllabi of PG Programme - M.E. Communication Systems

The Chairman thanked all the members for their kind cooperation and the meeting came to an end.

R. Niranjana
08/07/2021

MEMBER SECRETARY
BOARD OF STUDIES



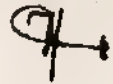
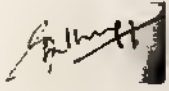


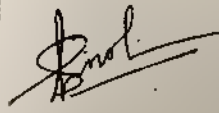
08/07/2021

CHAIRMAN

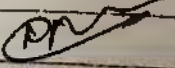


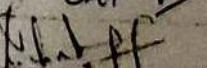

BOARD OF STUDIES
HEAD OF THE DEPARTMENT
Electronics and Communication Engineering
Francis Xavier Engineering College
Tirunelveli - 627 003
ecehod@francisxaviercollege.in

Attendance Sheet Table of Members

External Members present:

S. No	Members as per UGC Norms	Members Nominated	Signature
1	Head of the Department concerned (Chairman)	Mrs. J. Friska, Head & Asso. Prof, ECE department	
2	One Expert nominated by the Vice Chancellor from a panel of six recommended by the college Principal	Dr. G. Karpagarajesh Associate Professor, Department of Electronics and Communication Engineering, Government College of Engineering Tirunelveli	G. Karajesh
		Dr. S. Anand Associate Professor Department of Communication Engineering School Of Electronics Engineering (Sense) VIT-Vellore	
3	Two experts in the subject from outside the college nominated by the Academic Council	Dr. P. Sivakumar Professor, Department of Electronics and Communication Engineering, Kalasalingam University, Krishnankoil-626126, Virudhunagar, Tamil Nadu, India.	
4	One representative from industry/corporate sector/allied area relating to placement	Er. Francy Williams Senior Engineer, All India Radio, Palayamkottai, Tirunelveli	
5	One Post Graduate mentorous aluminous nominated by the Principal	Er. S. J. Jinolin Jacob HR manager, US Operations Insignia Technologies Pvt Ltd Trivandrum	

Internal Members Present:

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1	Dr. N. Muthukumar	Asso. Prof/ECE	
2	Dr. Subbulakshmi Nammalwar	Asso Prof/ECE	
3	Mrs M NavaneethaVelammal	Asso. Prof/ECE	
4	Mr C. Anand singh etoz	Asso. Prof/ECE	
5	Dr K Lakshmi Narayanan	Asst. Prof/ECE	

6	Dr.R.Kabilan	Asst. Prof/ECE	
7	Dr.Andrew Roobert	Asst. Prof/ECE	
8	Mr.S.Esakki Rajavel	Asst. Prof/ECE	
9	Mrs.M. Chitra Evangelin Christina	Asst. Prof/ECE	
10	Mr. P. Kannan	Asst. Prof/ECE	
11	Mr.M.Suresh Chinna Thampy	Asst. Prof/ECE	
12	Mr.S.Allwin Devaraj	Asst. Prof/ECE	
13	Mrs.E.Francy Irudaya Rani	Asst. Prof/ECE	
14	Mr.G.Jayaraman	Asst. Prof/ECE	
15	Mr.R.Prem Ananth	Asst. Prof/ECE	
16	Mr.B.Pradheep T Rajan	Asst. Prof/ECE	
17	Mrs.R.Niranjana	Asst. Prof/ECE	
18	Ms.N.Renee Segrid Reddiyar	Asst. Prof/ECE	
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Ex-Officio members present:

S. No	EX OFFICIO MEMBERS		Signature
1	Dr.V.Velmurugan	Principal, Francis Xavier Engineering College, TVL	 9/7/21
2	Dr.L.R.Priya, Asso.Prof, ECE Dept	Professor Academics, Francis Xavier Engineering College, Tirunelveli	 8/7/2021.
3	Dr.G.Rajakumar, Prof, ECE Dept.	Controller of Examinations, Francis Xavier Engineering College, Tirunelveli	 08/07/2021
4	Dr.M.Caroline Viola Stella Mary	ERP Head, Francis Xavier Engineering College, Tirunelveli	 9/7/21

Department of Electronics & Communication Engineering on 1st July 2021 Zoom online meet link:
<https://zoom.us/j/91794609757?pwd=VXhldVkyS2lGTXRFeCs4Q3Zydy9TQT09>

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Agenda" with a table of items. The name "ECE HOD" is visible on the right side of the slide. The participant list on the right includes 20 members.

ITEM NO.	PARTICULARS
ITEM 1.1	Fourth BOS Meeting Minutes
ITEM 1.2	Fourth Academic Council Meeting Minutes
ITEM 1.3	NIPTEL Courses for R2019
ITEM 1.4	R2021 B.E.-ECE Curriculum and Syllabus up to II Semester
ITEM 1.5	R 2021 M.E. (Communication Systems) and M.E. (VLSI Design) Curriculum and Syllabi
ITEM 1.6	Specialization/Minor courses
ITEM 1.7	Others

Participant List (20):

- Niranjana Maenelochare (Me)
- ECE HOD
- Alfwin Devraj
- amar Singh tetos
- Anand S Therapy
- Andrew Robert
- Chitra Evangelin Christina
- Dr P Sivasukumar Prof. ECE KARE
- Dr. K Lakshmi Narayanan
- francy inudaya rani
- G kar pagarajesh
- Jinolin Jacob S J

This screenshot shows the same Zoom meeting interface. The main content is the same "Agenda" slide. The name "G.karpagaraajesh" is visible on the right side of the slide. The participant list on the right is different, showing 20 members.

ITEM NO.	PARTICULARS
ITEM 1.1	Fourth BOS Meeting Minutes
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ITEM 1.3	NIPTEL Courses for R2019
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ITEM 1.6	Specialization/Minor courses
ITEM 1.7	Others

Participant List (20):

- Dr. K Lakshmi Narayanan
- francy inudaya rani
- G.karpagaraajesh
- Jinolin Jacob S J
- Kannan P
- Manly Rajakumar
- Pradheep T Rjan
- premananth
- Renee Reddier
- Santiago Stephen A
- Subbulakshmi
- Suresh Chinnathampy M

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Participants (20)

- Dr. K. Lakshmi Narayanan
- Kancy Sudaya ran
- k.karpagajesh
- Jinolin Jacob S J
- Kannan P
- Manly Rajakumar
- Pradheep T Rajan
- prem ananth
- Renee Reddier
- Santiago Stephen A
- Subbulakshmi
- Suresh Chennathampy M

ECE HOD

Suresh Chinnat...

Kannan P

S.NO	COURSE CODE	COURSE	DURATION (WEEKS)	COURSE STARTS	COURSE ENDS	URL
1	we21_001	Introduction to Internet of things	12	22/08/21	23/09/21	https://www.coursera.org/learn/iot-introduction-2021-2022-1001
2	we21_019	Artificial Intelligence Search Algorithms For Problem Solving	11	20/08/21	29/08/21	https://www.coursera.org/learn/ai-search-algorithms-2021-2022-1019
3	we21_046	Big Data Computing	8	22/08/21	29/08/21	https://www.coursera.org/learn/big-data-computing-2021-2022-1046
4	we21_042	Cloud Computing	8	22/08/21	29/08/21	https://www.coursera.org/learn/cloud-computing-2021-2022-1042
5	we21_045	Deep Learning for Computer Vision	12	22/08/21	29/08/21	https://www.coursera.org/learn/deep-learning-for-computer-vision-2021-2022-1045
6	we21_049	Data Science for Engineers	8	22/08/21	29/08/21	https://www.coursera.org/learn/data-science-for-engineers-2021-2022-1049
7	we21_076	Deep Learning - DTHouse	12	22/08/21	29/08/21	https://www.coursera.org/learn/deep-learning-dthouse-2021-2022-1076
8	we21_048	Hardware modeling using Verilog	8	22/08/21	29/08/21	https://www.coursera.org/learn/hardware-modeling-using-verilog-2021-2022-1048
9	we21_078	Introduction to Machine Learning - IITM	12	22/08/21	29/08/21	https://www.coursera.org/learn/introduction-to-machine-learning-iitm-2021-2022-1078

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Participants (22)

- G.karpagajesh
- Jinolin Jacob S J
- Kannan P
- Manly Rajakumar
- Pradheep T Rajan
- prem ananth
- Priya LR
- Renee Reddier
- Santiago Stephen A
- Subbulakshmi
- FRANCY
- Suresh Chinnathampy M

ECE HOD

Suresh Chinnat...

Kannan P

S.No	CATEGORY	CREDITS PER SEMESTER								TOTAL CREDIT	CREDITS IN %
		I	II	III	IV	V	VI	VII	VIII		
1	MEM	3	2	3	3					11	6.55%
2	IS	12	8	9						29	11.90%
3	ES	9	8	5						22	13.10%
4	PC	2	13	15	15	9	18			67	39.88%
5	PE					3	6	6	3	18	10.71%
6	OE					3	3	3	3	12	7.14%
7	EEC			1	1	2	4	4	6	18	10.71%
Total		24	19	23	19	23	25	23	12	148	100%

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ANNEXURE I

Action Taken report after presentation in Academic Council Meeting - IV

S.No	Topic	Suggestions	Action plan	Reflection In the Curriculum
1	Value added courses	To include "Wearable electronics" as one of the value-added courses.	Included the course under the list of value-added courses offered.	Included in the annexure I of curriculum
2	Minor courses	Select "IOT" as the area for offering minor courses.	Courses under IoT were listed	Included in the annexure II of curriculum
3	19EC7705-Blockchain Principles	Suggested to include this course as one of the electives	included this course as one of the electives	Page No. 141
4	19EC6712-Fibre Optic Networks	Free space optics to be included in the curriculum	Free space optics is included as a topic under the Fibre Optic Networks course	Page No 127
6	Industry support course	Accelerate talks with NI Drive to establish MoU and frame a syllabus for industry support course	MoU to be established and talks are in place for framing a syllabus	

ANNEXURE II
List of Online courses for Semester 5 - Regulation 2019

S.NO	COURSE CODE	COURSE	DURATION (WEEKS)	COURSE STARTS	EXAM DATE	URL
1	noc21_cs79	Artificial Intelligence Search Methods For Problem Solving	12	26-Jul-21	23-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs79/preview?
2	noc21_cs86	Big Data Computing	8	23-Aug-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs86/preview?
3	noc21_cs62	Cloud computing	8	23-Aug-21	23-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs62/preview?
4	noc21_cs93	Deep Learning for Computer Vision	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs93/preview?
5	noc21_cs69	Data Science for Engineers	8	26-Jul-21	26-Sep-21	https://onlinecourses.nptel.ac.in/noc21_cs69/preview?
6	noc21_cs76	Deep learning - IITRopar	12	26-Jul-21	23-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs76/preview?
7	noc21_cs60	Hardware modeling using verilog	8	26-Jul-21	26-Sep-21	https://onlinecourses.nptel.ac.in/noc21_cs60/preview?
8	noc21_cs70	Introduction to Machine Learning - IITM	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs70/preview?
9	noc21_cs85	Introduction to Machine Learning - IITKGP	8	26-Jul-21	26-Sep-21	https://onlinecourses.nptel.ac.in/noc21_cs85/preview?

SNO	COURSE CODE	COURSE	DURATION (WEEKS)	COURSE STARTS	EXAM DATE	URL
10	noc21_cs96	C-Based VLSI Design	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_cs96/preview?
11	noc21_bt50	Introduction to Biomedical Imaging Systems	12	26-Jul-21	23-Oct-21	https://onlinecourses.nptel.ac.in/noc21_bt50/preview?
12	noc21_ee85	Design for internet of things	8	26-Jul-21	26-Sep-21	https://onlinecourses.nptel.ac.in/noc21_ee85/preview?
13	noc21_ee112	Fundamentals of Electric vehicles: Technology & Economics	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_ee112/preview?
14	noc21_ee98	Integrated Photonics Devices and Circuits	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_ee98/preview?
15	noc21_ee87	Introduction to Photonics	12	26-Jul-21	23-Oct-21	https://onlinecourses.nptel.ac.in/noc21_ee87/preview?
16	noc21_ee86	Microelectronics: Devices To Circuits	12	26-Jul-21	24-Oct-21	https://onlinecourses.nptel.ac.in/noc21_ee86/preview?
17	noc21_ee97	System Design Through VERILOG	8	26-Jul-21	26-Sep-21	https://onlinecourses.nptel.ac.in/noc21_ee97/preview?

Grading of NPTEL courses:

90 - 100 : O ; 80 - 89 : A+; 75-79 : A; 74-60 : B+ ; 40-59 : B

ANNEXURE III**List of Specialization /Minor Degree in Internet of Things**

Course Code	Title	L	T	P	C
IoT-01	Introduction to Internet of Things	3	0	2	4
IoT-02	Embedded C And Python Programming	3	0	2	4
IoT-03	Sensors and Actuators	3	0	0	3
IoT-04	Embedded Systems for IOT	3	0	0	3
IoT-05	IOT with Arduino, ESP and Raspberry Pi	3	0	2	4
Total		15	0	6	18