5th Board of Studies Meeting in the Department of Electronics & Communication Engineering
Mode: Through Online (Meeting Link: https://zoom.us/j/91794609757?pwd=VXxldVkyS21GTXR6eC54Q3ZYy9JTQ109)
Date & Time: 1st July 2021 at 10 a.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

FXEC - Minutes of the 5th BoS Meeting held on 01.07.2021 – Dept of ECE
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:

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

6. Internal Members Present:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the Member</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. N. Muthukumaran</td>
<td>Asso. Prof/ECE</td>
</tr>
<tr>
<td>2</td>
<td>Dr.Subbulakshmi Nammalwar</td>
<td>Asso Prof/ECE</td>
</tr>
<tr>
<td>3</td>
<td>Mrs.M.NavaneethaVelammal</td>
<td>Asso. Prof/ECE</td>
</tr>
<tr>
<td>4</td>
<td>Mr.C.AmarsinghFeroz</td>
<td>Asso. Prof./ECE</td>
</tr>
<tr>
<td>S. No</td>
<td>Name of the Member</td>
<td>Position</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Dr. V. Velmurugan</td>
<td>Principal, Francis Xavier Engineering College, TVL</td>
</tr>
<tr>
<td>2</td>
<td>Dr. L. R. Priya, Asso. Prof, ECE Dept.</td>
<td>Professor Academics, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
<tr>
<td>3</td>
<td>Dr. G. Rajakumar, Prof, ECE Dept.</td>
<td>Controller of Examinations, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
<tr>
<td>4</td>
<td>Dr. M. Caroline Viola Stella Mary</td>
<td>ERP Head, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
</tbody>
</table>

Ex-Officio members present:

1. Dr. K. Lakshmi Narayanan
2. Dr. R. Kabilan
3. Dr. Andrew Roobert
4. Mr. S. Esakki Rajavel
5. Mrs. M. Chitra Evangelin Christina
6. Mr. P. Kannan
7. Mr. M. Suresh Chinna Thampy
8. Mr. S. Aliwin Devaraj
9. Mrs. E. Francy Irudaya Rani
10. Mr. G. Jayaraman
11. Mr. R. Prem Ananth
12. Mr. B. Pradheep T Rajan
13. Mrs. R. Niranjana
14. Ms. N. Renee Segrid Reddiyar
15. Mr. Santiago Stephen

Members Absent:

1. Mrs. D. Regi Timna

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
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.C.S - 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. Niranjan
MEMBER SECRETARY
BOARD OF STUDIES

CHIEF OFFICER
HEAD OF THE DEPARTMENT
Electronics and Communication Engineering
Francis Xavier Engineering College
Tirunelveli - 627 003
ecsebod@franciscanuniv.in

FXEC - Minutes of the 5th BoS Meeting held on 01.07.2021 – Dept of ECE
## External Members Present:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Members as per UGC Norms</th>
<th>Members Nominated</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head of the Department concerned (Chairman)</td>
<td>Mrs. J. Friska, Head &amp; Asst Prof, ECE department</td>
<td>[Signature]</td>
</tr>
<tr>
<td>2</td>
<td>One Expert nominated by the Vice Chancellor from a panel of six recommended by the college Principal</td>
<td>Dr. G. Karpagaranjesh, Associate Professor, Department of Electronics and Communication Engineering, Government College of Engineering, Tirunelveli</td>
<td>[Signature]</td>
</tr>
<tr>
<td></td>
<td>Two experts in the subject from outside the college nominated by the Academic Council</td>
<td>Dr. S. Anand, Associate Professor, Department of Communication Engineering, School of Electronics Engineering (Sense) VIT-Vellore</td>
<td>[Signature]</td>
</tr>
<tr>
<td>3</td>
<td>One representative from industry/corporate sector/related area relating to placement</td>
<td>Dr. P. Sivakumar, Professor, Department of Electronics and Communication Engineering, Kalasalingam University, Krishnankoil-626126, Virudhunagar, Tamil Nadu, India.</td>
<td>[Signature]</td>
</tr>
<tr>
<td>4</td>
<td>One Post Graduate meritorious alumnus nominated by the Principal</td>
<td>Er. Francy Williams, Senior Engineer, All India Radio, Palayamkottai, Tirunelveli</td>
<td>[Signature]</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Er. S. J. Jinoth Jacob, HR Manager, US Operations, Insignia Technologies Pvt Ltd, Trivandrum</td>
<td>[Signature]</td>
</tr>
</tbody>
</table>

## Internal Members Present:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the Member</th>
<th>Designation</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. N. Muthukumaran</td>
<td>Asst Prof/ECE</td>
<td>[Signature]</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Subbulakshmi Namudur</td>
<td>Asst Prof/ECE</td>
<td>[Signature]</td>
</tr>
<tr>
<td>3</td>
<td>Mrs. M. Navaneetha Velumalai</td>
<td>Asst Prof/ECE</td>
<td>[Signature]</td>
</tr>
<tr>
<td>4</td>
<td>Mr. C. Anasamsigh</td>
<td>Asst Prof/ECE</td>
<td>[Signature]</td>
</tr>
<tr>
<td>5</td>
<td>Dr. K. Lakshmi Narayanan</td>
<td>Asst Prof/ECE</td>
<td>[Signature]</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Designation</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>--------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Dr. R. Kabilan</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Dr. Andrew Roobert</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mr. S. Esakkil Rajavel</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mrs. M. Chitra Evangelin Christina</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mr. P. Kannan</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mr. M. Suresh Chinna Thampy</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mr. S. Allwin Devaraj</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Mrs. E. Francy Irudaya Rani</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mr. G. Jayaraman</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Mr. R. Prem Ananth</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Mr. B. Pradheep T Rajan</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Mrs. R. Niranjana</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Ms. N. Renee Segrid Reddyar</td>
<td>Asst. Prof/ECE</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Mr. Santiago Stephen</td>
<td>Asst Prof/Maths</td>
<td></td>
</tr>
</tbody>
</table>

Ex-Officio members present:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. V. Vel murugan</td>
<td>Principal, Francis Xavier Engineering College, TVL</td>
</tr>
<tr>
<td>2</td>
<td>Dr. L. R. Priya, Asso. Prof, ECE Dept</td>
<td>Professor Academics, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
<tr>
<td>3</td>
<td>Dr. G. Rajakumar, Prof, ECE Dept.</td>
<td>Controller of Examinations, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
<tr>
<td>4</td>
<td>Dr. M. Caroline Viola Stella Mary</td>
<td>ERP Head, Francis Xavier Engineering College, Tirunelveli</td>
</tr>
</tbody>
</table>

Signature: [Signature]

FXEC - Minutes of the 5th BoS Meeting held on 01.07.2021 – Dept of ECE
Department of Electronics & Communication Engineering on 1st July 2021 Zoom online meet link: https://zoom.us/j/91794607757?pwd=VXhkdVkyS21GTXRBcG41b3Zydy9TQT09

Agenda

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>PARTICULARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 1.4</td>
<td>Fourth BoS Meeting Minutes</td>
</tr>
<tr>
<td>ITEM 1.2</td>
<td>Fourth Academic Council Meeting Minutes</td>
</tr>
<tr>
<td>ITEM 1.3</td>
<td>NPTEL Courses for R2019</td>
</tr>
<tr>
<td>ITEM 1.4</td>
<td>R2019 GEIC Curriculum and syllabus to II Semester</td>
</tr>
<tr>
<td>ITEM 1.5</td>
<td>R2021 M.E. (Communication Systems and M.E. VLSI Design) Curriculum and syllabus Specimen and more courses</td>
</tr>
<tr>
<td>ITEM 1.6</td>
<td>Others</td>
</tr>
</tbody>
</table>

FXEC - Minutes of the 5th BoS Meeting held on 01.07.2021 – Dept of ECE
<table>
<thead>
<tr>
<th>S.No</th>
<th>Topic</th>
<th>Suggestions</th>
<th>Action plan</th>
<th>Reflection in the Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Value added courses</td>
<td>To include &quot;Wearable electronics&quot; as one of the value-added courses.</td>
<td>Included the course under the list of value-added courses offered.</td>
<td>Included in the annexure I of curriculum</td>
</tr>
<tr>
<td>2</td>
<td>Minor courses</td>
<td>Select &quot;IOT&quot; as the area for offering minor courses.</td>
<td>Courses under IoT were listed</td>
<td>Included in the annexure II of curriculum</td>
</tr>
<tr>
<td>3</td>
<td>19EC7705: Blockchain Principles</td>
<td>Suggested to include this course as one of the electives</td>
<td>included this course as one of the electives</td>
<td>Page No. 141</td>
</tr>
<tr>
<td>4</td>
<td>19EC6712: Fibre Optic Networks</td>
<td>Free space optics to be included in the curriculum</td>
<td>Free space optics is included as a topic under the Fibre Optic Networks course</td>
<td>Page No 127</td>
</tr>
<tr>
<td>6</td>
<td>Industry support course</td>
<td>Accelerate talks with NI Drive to establish MoU and frame a syllabus for industry support course</td>
<td>MoU to be established and talks are in place for framing a syllabus</td>
<td></td>
</tr>
</tbody>
</table>

FXEC - Minutes of the 5th BoS Meeting held on 01.07.2021 – Dept of ECE
## List of Online courses for Semester 5 - Regulation 2019

<table>
<thead>
<tr>
<th>S.NO</th>
<th>COURSE CODE</th>
<th>COURSE</th>
<th>DURATION (WEEKS)</th>
<th>COURSE STARTS</th>
<th>EXAM DATE</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>noc21_cs79</td>
<td>Artificial Intelligence</td>
<td>12</td>
<td>26-Jul-21</td>
<td>23-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs79/preview">https://onlinecourses.nptel.ac.in/noc21_cs79/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Search Methods For</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Problem Solving</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>noc21_cs86</td>
<td>Big Data Computing</td>
<td>8</td>
<td>23-Aug-21</td>
<td>24-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs86/preview">https://onlinecourses.nptel.ac.in/noc21_cs86/preview</a> w2</td>
</tr>
<tr>
<td>4</td>
<td>noc21_cs93</td>
<td>Deep Learning for</td>
<td>12</td>
<td>26-Jul-21</td>
<td>24-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs93/preview">https://onlinecourses.nptel.ac.in/noc21_cs93/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computer Vision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>noc21_cs69</td>
<td>Data Science for</td>
<td>8</td>
<td>26-Jul-21</td>
<td>26-Sep-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs69/preview">https://onlinecourses.nptel.ac.in/noc21_cs69/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>noc21_cs76</td>
<td>Deep learning - IITRopar</td>
<td>12</td>
<td>26-Jul-21</td>
<td>23-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs76/preview">https://onlinecourses.nptel.ac.in/noc21_cs76/preview</a> w2</td>
</tr>
<tr>
<td>7</td>
<td>noc21_cs60</td>
<td>Hardware modeling using</td>
<td>8</td>
<td>26-Jul-21</td>
<td>26-Sep-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs60/preview">https://onlinecourses.nptel.ac.in/noc21_cs60/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>verilog</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>noc21_cs70</td>
<td>Introduction to Machine</td>
<td>12</td>
<td>26-Jul-21</td>
<td>24-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs70/preview">https://onlinecourses.nptel.ac.in/noc21_cs70/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning - IITM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>noc21_cs85</td>
<td>Introduction to Machine</td>
<td>8</td>
<td>26-Jul-21</td>
<td>26-Sep-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs85/preview">https://onlinecourses.nptel.ac.in/noc21_cs85/preview</a> w2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning - IITKGP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L_NO</td>
<td>COURSE  CODE</td>
<td>COURSE</td>
<td>DURATION</td>
<td>COURSE STARTS</td>
<td>EXAM DATE</td>
<td>URL</td>
</tr>
<tr>
<td>------</td>
<td>--------------</td>
<td>-----------------------</td>
<td>-----------</td>
<td>---------------</td>
<td>-----------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>10</td>
<td>noc21_cs96</td>
<td>C-Based VLSI Design</td>
<td>12</td>
<td>26-Jul-21</td>
<td>24-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_cs96/previeww2">https://onlinecourses.nptel.ac.in/noc21_cs96/previeww2</a></td>
</tr>
<tr>
<td>12</td>
<td>noc21_ee85</td>
<td>Design for internet of things</td>
<td>8</td>
<td>26-Jul-21</td>
<td>26-Sep-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_ee85/previeww2">https://onlinecourses.nptel.ac.in/noc21_ee85/previeww2</a></td>
</tr>
<tr>
<td>15</td>
<td>noc21_ee87</td>
<td>Introduction to Photonics</td>
<td>12</td>
<td>26-Jul-21</td>
<td>23-Oct-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_ee87/previeww2">https://onlinecourses.nptel.ac.in/noc21_ee87/previeww2</a></td>
</tr>
<tr>
<td>17</td>
<td>noc21_ee97</td>
<td>System Design Through VERILOG</td>
<td>8</td>
<td>26-Jul-21</td>
<td>26-Sep-21</td>
<td><a href="https://onlinecourses.nptel.ac.in/noc21_ee97/previeww2">https://onlinecourses.nptel.ac.in/noc21_ee97/previeww2</a></td>
</tr>
</tbody>
</table>

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**

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