



|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust *

SJC INSTITUTE OF TECHNOLOGY

Chickballapur – 562 101

Estd: 1986

Department of Information Science & Engineering

LESSON PLAN

| | | | |
|---|--|--------------------------------------|-------------------|
| SUBJECT TITLE | INTERNET OF THINGS TECHNOLOGY | | |
| SUBJECT TYPE | CORE /ELECTIVE | | |
| SUBJECT CODE | 17CS81 | | |
| ACADEMIC YEAR | 2021 (EVEN SEMESTER) | BATCH | 2017-2021 |
| SCHEME | CBCS scheme (Effective from the academic year 2017 -2018) | | |
| SEMESTER & SECTION | VIII A SECTION | | |
| IA MARKS | 40 | EXAM MARKS | 60 |
| NUMBER OF LECTURE HOURS/WEEK | 4 | TOTAL NUMBER OF LECTURE HOURS | 50 |
| FACULTY NAME | CHETHAN.H.V | NO. OF TIMES HANDLED | 2 / First-time |
| COURSE LEARNING OBJECTIVES: This course will enable students to | | | |
| <ul style="list-style-type: none"> Assess the genesis and impact of IoT applications, architectures in real world. Illustrate diverse methods of deploying smart objects and connect them to network. Compare different Application protocols for IoT. Infer the role of Data Analytics and Security in IoT. Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry. | | | |
| Course Outcomes: At the end of this course, students are able to: | | | |
| CO1 | Interpret the impact and challenges posed by IoT networks leading to new architectural models. | | |
| CO2 | Compare and contrast the deployment of smart objects and the technologies to connect them to network. | | |
| CO3 | Appraise the role of IoT protocols for efficient network communication | | |
| CO4 | Elaborate the need for Data Analytics and Security in IoT | | |
| CO5 | Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry. | | |

CO-PO MATRIX

| COURSE OUTCOMES | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | 1 | 1 |
| CO2 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | 1 | 2 | 1 |
| CO3 | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 |
| CO4 | 1 | 2 | 2 | - | 2 | - | - | - | - | - | - | 1 | 1 | 1 |
| CO5 | 2 | 1 | 1 | 1 | 1 | 1 | - | - | - | - | - | 1 | 1 | 2 |

JUSTIFICATIONS FOR CO-PO MAPPING

| MAPPING | 3/2/1 | JUSTIFICATION |
|----------|-------|---|
| CO1-PO1 | 2 | Knows about challenges in IOT & able to give solution with new architecture |
| CO1-PO2 | 1 | Able to identify challenges & analyze to overcome challenges |
| CO1-PO3 | 1 | Able to develop components to meet the challenges |
| CO1-PO12 | 1 | Continuous learning helps to know day to day challenges |
| CO1-PSO1 | 1 | Employ new communication model to overcome challenges |
| CO1-PSO2 | 1 | Use of low power & reliable network for industry purpose |
| CO2-PO1 | 1 | Knowledge about things and technologies to connect things/objects to network (wireless). |
| CO2-PO2 | 1 | Identify how objects are made to communicate with various wireless technologies & analyze its performance with various merits. |
| CO2-PO3 | 2 | Able to give solutions for specific needs through IOT based applications which are helpful for health, security, environmental etc.. |
| CO2-PO12 | 1 | Need to learn evolving smart objects & technologies so as to change as per developments. |
| CO2-PSO1 | 2 | Learning and employ new wireless sensor technology |
| CO2-PSO2 | 1 | Use efficient sensor devices with less cost for industry automation |
| CO3-PO1 | 2 | Knowledge about different layer protocols need for M2M communication/network is gained. |
| CO3-PO2 | 2 | Identify the new protocols requirement as per the global standardization by analyzing existing protocols. |
| CO3-PO12 | 1 | Need to know changes in global standardization |
| CO3-PSO1 | 1 | Knowledge about Protocols used and modernize existing protocols as per IOT standards. |
| CO3-PSO2 | 1 | Use of different protocols for improve performance & reliable communication |
| CO4-PO1 | 1 | Knowledge about IOT related data management & security challenges in IOT based applications |
| CO4-PO2 | 2 | Identify & analyze various categories of data that can be sensed, processed, stored & communicated via network , also use of different security techniques. |
| CO4-PO3 | 2 | Able to develop solutions for gathering of data, faster processing, storage solution & security challenges. |
| CO4-PO5 | 2 | Use of data analytic tools for analysis also using simulation tools. |
| CO4-PO12 | 1 | updating about new tools for analysis & security purpose. |
| CO4-PSO1 | 1 | Learn about IOT data analysis & security need using tools |
| CO4-PSO2 | 1 | Use of analysis to improve system performance, use enhanced security techniques for IOT based real time data. |
| CO5-PO1 | 2 | Knowledge about WSN & PAN required for IOT application development. |
| CO5-PO2 | 1 | Identify which IEEE 802.15. __ standard is used for application that works with real world values. |
| CO5-PO3 | 1 | Develop & analyze applications required for industry automation. |
| CO5-PO4 | 1 | Design new automation techniques for Industry automation (M2M communication without interference of human) through research. |
| CO5-PO5 | 1 | Able to use tools for develop & analyze new IOT based applications & networks for communication. |
| CO5-PO6 | 1 | IOT applications are made simple, cheaper for monitoring health, |

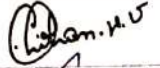
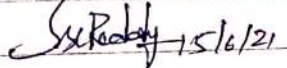
| | | |
|----------|---|---|
| | | environment & societal purpose. |
| CO5-PO12 | 1 | Learning about new sensor techniques. |
| CO5-PSO1 | 1 | Learn about new sensor technologies |
| CO5-PSO2 | 2 | Develop applications used for industry automation |

DELIVERY PLAN WITH DETAILS

MODULE – 1

| Lecture # | Topic | Mode of Delivery (Pls Tick ✓) | | | | Date of Delivery | COs Covered |
|-----------|---|-------------------------------|---|---|---|------------------|-------------|
| | | 1 | 2 | 3 | 4 | | |
| 1 | What is IoT, Genesis of IoT, IoT and Digitization | Online | | | | 22/4 | Co-1 |
| 2 | IoT Impact | | ✓ | | | 22/4 | Co-1 |
| 3 | Convergence of IT and IoT | | ✓ | | | 23/4 | Co-1 |
| 4 | IoT Challenges | | ✓ | | | 29/4 | Co-1 |
| 5 | IoT Network Architecture and Design | | ✓ | | | 29/4 | Co-1 |
| 6 | Drivers Behind New Network Architectures | | ✓ | | | 30/4 | Co-1 |
| 7 | Comparing IoT Architectures | | ✓ | | | 6/5 | Co-1 |
| 8 | A Simplified IoT Architecture | | ✓ | | | 6/5 | Co-1 |
| 9 | The Core IoT Functional Stack | | ✓ | | | 7/5 | Co-1 |
| 10 | IoT Data Management and ComputeStack | | ✓ | | | 7/5 | Co-1 |

Textbook : David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743) and Chapter 1 and Chapter 2

| | | | | |
|------------|--|--------|----------|-------|
| Signatures | Faculty:  | #HOURS | Allotted | Taken |
| | He ^{ad} :  | | 10 | 10 |
| Remarks | Executed as per plan. | | | |

MODULE – 2

| Lecture # | Topic | Mode of Delivery (Pls Tick ✓) | | | | Date of Delivery | COs Covered |
|-----------|---------------------------------------|-------------------------------|---|---|---|------------------|-------------|
| | | 1 | 2 | 3 | 4 | | |
| 1 | Smart Objects: The "Things" in IoT, | | ✓ | | | 13/5 | Co-2 |
| 2 | Sensors, Actuators, and Smart Objects | | ✓ | | | 13/5 | Co-2 |
| 3 | Sensors, Actuators, and Smart Objects | | ✓ | | | 14/5 | Co-2 |
| 4 | Sensor Networks, | | ✓ | | | 20/5 | Co-2 |
| 5 | Connecting Smart Objects | | ✓ | | | 20/5 | Co-2 |
| 6 | Communications Criteria | | ✓ | | | 21/5 | Co-2 |
| 7 | IoT Access Technologies. | | ✓ | | | 23/5 | Co-2 |
| 8 | IoT Access Technologies. | | ✓ | | | 23/5 | Co-2 |
| 9 | IoT Access Technologies. | | ✓ | | | 3/6 | Co-2 |
| 10 | IoT Access Technologies. | | ✓ | | | 3/6 | Co-2 |

Textbook : David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743) and Chapter 3 and Chapter 4

| | | | | |
|------------|----------------------------------|--------|----------|-------|
| Signatures | Faculty: <i>[Signature]</i> | #HOURS | Allotted | Taken |
| | HoD: <i>[Signature]</i> 15/12/21 | | 10 | 10 |
| Remarks | Executed as per plan | | | |

MODULE - 3

| Lecture # | Topic | Mode of Delivery (Pls Tick ✓) | | | | Date of Delivery | COs Covered |
|-----------|-----------------------------------|-------------------------------|---|---|---|------------------|-------------|
| | | 1 | 2 | 3 | 4 | | |
| 1 | IPs the IoT Network Layer | | ✓ | | | 4/6 | Co-3 |
| 2 | The Business Case for IP | | ✓ | | | 10/6 | Co-3 |
| 3 | The need for Optimization | | ✓ | | | 10/6 | Co-3 |
| 4 | Optimizing IP for IoT | | ✓ | | | 11/6 | Co-3 |
| 5 | Optimizing IP for IoT | | ✓ | | | 17/6 | Co-3 |
| 6 | Profiles and Compliances | | ✓ | | | 17/6 | Co-3 |
| 7 | Application Protocols for IoT, | | ✓ | | | 18/6 | Co-3 |
| 8 | The Transport Layer | | ✓ | | | 24/6 | Co-3 |
| 9 | IoT Application Transport Methods | | ✓ | | | 24/6 | Co-3 |
| 10 | IoT Application Transport Methods | | ✓ | | | 25/6 | Co-3 |

Textbook : David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743) and Chapter 5 and Chapter 6

| | | | | |
|------------|--------------------------------|--------|----------|-------|
| Signatures | Faculty: <i>[Signature]</i> | #HOURS | Allotted | Taken |
| | HoD: <i>[Signature]</i> 5/7/21 | | 10 | 10 |
| Remarks | Executed as per plan | | | |

MODULE - 4

| Lecture # | Topic | Mode of Delivery (Pls Tick ✓) | | | | Date of Delivery | COs Covered |
|-----------|---|-------------------------------|---|---|---|------------------|-------------|
| | | 1 | 2 | 3 | 4 | | |
| 1 | Data and Analytics for IoT, An Introduction to Data Analytics for IoT | | ✓ | | | 1/7 | Co-4 |
| 2 | Machine Learning, | | ✓ | | | 1/7 | Co-4 |
| 3 | Big Data Analytics Tools and Technology | | ✓ | | | 2/7 | Co-4 |

| | | | | | | | |
|----|--|--|---|--|--|-----|------|
| 4 | Edge Streaming Analytics, Network Analytics | | ✓ | | | 2/7 | CO-4 |
| 5 | Securing IoT, A Brief History of OT Security, | | ✓ | | | 5/7 | CO-4 |
| 6 | Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, | | ✓ | | | 6/7 | CO-4 |
| 7 | Formal Risk Analysis Structures: OCTAVE and FAIR, | | ✓ | | | 6/7 | CO-4 |
| 8 | Formal Risk Analysis Structures: OCTAVE and FAIR, | | ✓ | | | 7/7 | CO-4 |
| 9 | The Phased Application of Security in an Operational Environment | | ✓ | | | 7/7 | CO-4 |
| 10 | The Phased Application of Security in an Operational Environment | | ✓ | | | 8/7 | CO-4 |

Textbook : David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743) and Chapter 7 and Chapter 8

| | | | | |
|------------|------------------------------|--------|----------|-------|
| Signatures | Faculty: <i>Dhanu H.V</i> | #HOURS | Allotted | Taken |
| | HOD: <i>S. Reddy 10/7/21</i> | | | |
| Remarks | <i>Executed as per plan.</i> | | | |

MODULE - 5

| Lecture # | Topic | Mode of Delivery (Pls Tick ✓) | | | | Date of Delivery | COs Covered |
|-----------|--|-------------------------------|---|---|---|------------------|-------------|
| | | 1 | 2 | 3 | 4 | | |
| 1 | IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming | | ✓ | | | 8/7 | CO-5 |
| 2 | IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming | | ✓ | | | 9/7 | CO-5 |
| 3 | IoT Physical Devices and Endpoints - Raspberry Pi: Introduction to Raspberry Pi, | | ✓ | | | 9/7 | CO-5 |
| 4 | About the Raspberry Pi Board: Hardware Layout, Operating Systems on Raspberry Pi, | | ✓ | | | 10/7 | CO-5 |
| 5 | About the Raspberry Pi Board: Hardware Layout, Operating Systems on Raspberry Pi, | | ✓ | | | 11/7 | CO-5 |
| 6 | Configuring Raspberry Pi, Programming Raspberry Pi with Python, | | ✓ | | | 12/7 | CO-5 |
| 7 | Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor | | ✓ | | | 13/7 | CO-5 |
| 8 | Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to Raspberry Pi | | ✓ | | | 13/7 | CO-5 |
| 9 | Smart and Connected Cities, An IoT Strategy for Smarter | | ✓ | | | 14/7 | CO-5 |

| | | | | | | | |
|--|---|--------|----|----|--|----------|-------|
| 10 | Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples. | | | | | 14-7 | CO-5 |
| Textbook : Srinivasa K G, "Internet of Things", CENGAGE Learning India, 2017 | | | | | | Allotted | Taken |
| Signatures | Faculty: <i>[Signature]</i> HoD: <i>[Signature]</i> - 15/7/21 | #HOURS | 10 | 10 | | | |
| Remarks | Executed as per plan. | | | | | | |

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)
2. Srinivasa K G, "Internet of Things", CENGAGE Learning India, 2017

Reference Books:

1. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition. VPT. 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

(Note: Mode of Delivery : 1.Black Board 2.PPT 3.Video 4.Demo/Hands-on)

INTERNAL/ASSIGNMENT/QUIZ SCHEDULE

| TEST and QUIZ | | COs and Portions Covered | | ASSIGNMENT | |
|-----------------|------|--------------------------|---------|-------------|------|
| Test# and Quiz# | DATE | CO | Modules | Assignment# | DATE |
| T1 & Q1 | 27/5 | CO1 & CO2 | M1 & M2 | A1 | 24/5 |
| T2 & Q2 | 28/6 | CO2 & CO3 | M2 & M3 | A2 | 24/6 |
| T3 & Q3 | 15/7 | CO4 & CO5 | M4 & M5 | A3 | 7/7 |


SUMMARY

| | | | | |
|----------------------|-----------------------------------|--------------|----------|-------|
| Signatures With Date | Faculty: <i>[Signature]</i> | Total #HOURS | Allotted | Taken |
| | HoD: <i>[Signature]</i> - 15/7/21 | | 50 | 50 |
| Remarks | 100% syllabus covered. | | | |

ENCLOSURES

1. Syllabus
2. CO Attainment
3. Gap Analysis
4. Special lectures/talks arranged if any

Feedback by PAC


Faculty


Course coordinator

PAC


HOD



Estd: 1986

|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust *

SJC INSTITUTE OF TECHNOLOGY

Chickballapur – 562 101

Department of Information Science & Engineering

QUESTION BANK

| | | | |
|-------------------------------------|----------------------------------|--------------|-----------|
| SUBJECT TITLE | INTERNET OF THINGS TECHNOLOGY | | |
| SUBJECT TYPE | CORE /-ELECTIVE | | |
| SUBJECT CODE | 17CS81 | | |
| ACADEMIC YEAR | 2021 (EVEN SEMESTER) | BATCH | 2017-2021 |
| SCHEME | CBCS scheme- 2017 | | |
| SEMESTER | VIII & A SECTION | | |
| FACULTY NAME and DESIGNATION | CHETHAN.H.V, Assistant Professor | | |

| <i>Module -1</i> | | | |
|------------------|--|-------------------|------------|
| <i>Q. No.</i> | <i>Questions</i> | <i>Bloom's LL</i> | <i>COs</i> |
| 1 | What is fog computing? Describe the characteristics of fog computing? | L1 | CO1 |
| 2 | Describe the various IoT Challenges. | L1 | CO1 |
| 3 | List out the difference between IT and OT networks. | L1 | CO1 |
| 4 | Explain in detail on Genesis of IoT. | L2 | CO1 |
| 5 | Explain the IoT Architectural Drivers. | L2 | CO1 |
| 6 | Explain the Access Network Sublayer. | L2 | CO1 |
| 7 | Demonstrate the impact of IoT on connected roadways. | L3 | CO1 |
| 8 | Demonstrate the IoT Reference model published by the IoT World Forum. | L3 | CO1 |
| 9 | Differentiate between IoT and Digitization? | L4 | CO1 |
| 10 | How can we reduce the IoT Architectures framework down to a pair of three-layer stacks? Evaluate the same. | L5&L6 | CO1 |

SJCIT

| Module -2 | | | |
|-----------|--|------------|-----|
| Q. No. | Questions | Bloom's LL | COs |
| 1 | List out the various types of Sensors. | L1 | CO2 |
| 2 | List out the various types of Actuators. | L1 | CO2 |
| 3 | Describe the design constraints for Wireless Smart Objects. | L1 | CO2 |
| 4 | Explain the protocol stack utilizing IEEE802.15.4. | L2 | CO2 |
| 5 | Explain the 4 characteristics of Smart Objects. | L2 | CO2 |
| 6 | What is SANET? Explain some of the advantages and disadvantages that a wireless-based solution offers. | L2 | CO2 |
| 7 | Demonstrate the LoRaWAN layers of IoT Access Technologies. | L3 | CO2 |
| 8 | Demonstrate the ZigBee IP Protocol stack. | L3 | CO2 |
| 9 | Illustrate the various communication criteria. | L4 | CO2 |
| 10 | How Sensors and Actuators interact with the physical world? Evaluate the same. | L5&L6 | CO2 |

| Module -3 | | | |
|-----------|---|------------|-----|
| Q. No. | Questions | Bloom's LL | COs |
| 1 | Describe the key advantages of Internet Protocol. | L1 | CO3 |
| 2 | Define the two main protocols that are specified for Transport layer. | L1 | CO3 |
| 3 | Describe the DNP3 Protocol over 6LoWPAN Networks with MAP-T. | L1 | CO3 |
| 4 | What is Adaptation and Adoption of IP? Explain the factors that trying to determine, which model is best suit for last-mile connectivity? | L2 | CO3 |
| 5 | Explain the Need for IP Optimization by considering constrained nodes, networks & IP versions. | L2 | CO3 |
| 6 | Explain the Protocol stack for Transporting Serial DNP3 SCADA over IP. | L2 | CO3 |
| 7 | Demonstrate the Constrained Application Protocol (CoAP) along with its message format and message field. | L3 | CO3 |

| | | | |
|----|--|-------|-----|
| 8 | Write a note on following: a) Comparison of an IOT Protocol Stack Utilizing 6LoWPAN b) 6LoWPAN Header stacks c) 6LoWPAN Fragmentation Header d) Application Layer Protocol not present | L3 | CO3 |
| 9 | Illustrate the working of MQTT Publish/Subscribe Framework. | L4 | CO3 |
| 10 | How to Optimize IP for IoT using an Adaptation layer? Evaluate the same. | L5&L6 | CO3 |

Module -4

| <i>Q. No.</i> | <i>Questions</i> | <i>Bloom's LL</i> | <i>COs</i> |
|---------------|---|-------------------|------------|
| 1 | List out the Types of Data Analysis Results. | L1 | CO4 |
| 2 | List out the common challenges faced in OT security. | L1 | CO4 |
| 3 | Describe the concept of Distributed Analytics throughout the IoT system. | L1 | CO4 |
| 4 | What is Machine Learning? Explain its types. | L2 | CO4 |
| 5 | Explain any two Big data analytics tools and technologies (MPP/NoSQL/Hadoop). | L2 | CO4 |
| 6 | Explain Lambda Architecture for Parallel data flow. | L2 | CO4 |
| 7 | Demonstrate the Flexible Netflow Architecture. | L3 | CO4 |
| 8 | Write a note on following: a) Structured versus unstructured data b) Data in Motion versus Data in Rest | L3 | CO4 |
| 9 | Illustrate the concept of OCTAVE and FAIR. | L4 | CO4 |
| 10 | How IT and OT security practices and systems vary in real time? Evaluate the same. | L5&L6 | CO4 |

Module -5

| <i>Q. No.</i> | <i>Questions</i> | <i>Bloom's LL</i> | <i>COs</i> |
|---------------|--|-------------------|------------|
| 1 | What is Arduino? What are the advantages of Arduino? | L1 | CO5 |
| 2 | What are the Key Use Cases for Smart Cities. | L1 | CO5 |
| 3 | Describe the concept of Smart Traffic Control. | L1 | CO5 |
| 4 | Explain in detail Smart City IoT Architecture. | L2 | CO5 |

| | | | |
|----|---|-------|-----|
| 5 | Explain the Raspberry Pi board with neat diagram. | L2 | CO5 |
| 6 | Explain the wireless temperature monitoring system using Raspberry Pi. | L2 | CO5 |
| 7 | Demonstrate the Smart City Security Architecture. | L3 | CO5 |
| 8 | Demonstrate the case study of Connected Street Lighting with respect to Smart City. | L3 | CO5 |
| 9 | Differentiate between Raspberry Pi and Arduino. | L4 | CO5 |
| 10 | How to install Arduino software for the windows PCs? Evaluate the same. | L5&L6 | CO5 |

Note:

1. Questions shall be framed by consolidating comprehensively from the following sources
 - Exercise problems of text books/ references
 - Previous year question VTU exam Question paper. (Mark the year/exam beside the question)
 - Questions by Experts during Interview/Academic Audit
 - Internet sources/ other Universities examination question papers.
 - Own / experience.
 - Gate questions mentioning the year.
2. Questions shall follow all the Bloom's learning levels with appropriate action verbs
3. There shall be a total of 50 questions considering 10 questions from each module, of which, 3 questions each at L1 and L2, 2 questions at L3, 1 question each at L4 and L5/L6.
4. Ensure the coverage of all Cos.



Estd: 1986

|| Jal Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust *

SJC INSTITUTE OF TECHNOLOGY

Chickballapur – 562 101

Department of Information Science & Engineering ASSIGNMENT

| | | | |
|-------------------------------------|----------------------------------|--------------|-----------|
| SUBJECT TITLE | INTERNET OF THINGS TECHNOLOGY | | |
| SUBJECT TYPE | CORE / -ELECTIVE | | |
| SUBJECT CODE | 17CS81 | | |
| ACADEMIC YEAR | 2021 (EVEN SEMESTER) | BATCH | 2017-2021 |
| SCHEME | CBCS scheme- 2017 | | |
| SEMESTER | VIII A SECTION | | |
| FACULTY NAME and DESIGNATION | CHETHAN.H.V, Assistant Professor | | |

Module -1

| Q. No. | Questions | Bloom's LL | COs |
|--------|---|------------|-----|
| 1 | Demonstrate the impact of IoT on connected roadways. | L3 | CO1 |
| 2 | Demonstrate the impact of IoT on connected Factory. | L3 | CO1 |
| 3 | Demonstrate the IoT Reference model published by the IoT World Forum. | L3 | CO1 |
| 4 | How can you differentiate the term IoT with respect to Digitization? | L4&L5 | CO1 |
| 5 | How can we reduce the IoT Architectures framework down to a pair of three-layer stacks? | L4&L5 | CO1 |

Module -2

| Q. No. | Questions | Blooms LL | COs |
|--------|---|-----------|-----|
| 1 | Demonstrate the LoRaWAN layers of IoT Access Technologies. | L3 | CO2 |
| 2 | Show the various types of Sensors and Actuators? Also write example for each. | L3 | CO2 |
| 3 | Demonstrate the ZigBee IP Protocol stack. | L3 | CO2 |
| 4 | How can you design the constraints for Wireless Smart Objects? | L4&L5 | CO2 |
| 5 | How Sensors and Actuators interact with the physical world? | L4&L5 | CO2 |

Module -3

SJCIT

| | | | <i>Bloom's LL</i> | <i>COs</i> |
|---------------|--|--|-------------------|------------|
| <i>Q. No.</i> | <i>Questions</i> | | | |
| 1 | Demonstrate the Constrained Application Protocol (CoAP) along with its message format and message field. | | L3 | CO3 |
| 2 | Discover the key advantages of Internet Protocol. | | L3 | CO3 |
| 3 | Write a note on following: a) 6LoWPAN Fragmentation Header b) Application Layer Protocol not present | | L3 | CO3 |
| 4 | How can you say that MQTT is a Lightweight protocol? Illustrate the working of MQTT Publish/Subscribe Framework? | | L4&L5 | CO3 |
| 5 | How to Optimize IP for IoT using an Adaptation layer? | | L4&L5 | CO3 |

Module -4

| | | | <i>Bloom's LL</i> | <i>COs</i> |
|---------------|---|--|-------------------|------------|
| <i>Q. No.</i> | <i>Questions</i> | | | |
| 1 | Demonstrate the Flexible Netflow Architecture. | | L3 | CO4 |
| 2 | Demonstrate the concept of OCTAVE. | | L3 | CO4 |
| 3 | Discover the common challenges faced in OT security. | | L3 | CO4 |
| 4 | How can you differentiate between Structured versus unstructured data | | L4&L5 | CO4 |
| 5 | How IT and OT security practices and systems vary in real time? | | L4&L5 | CO4 |

Module -5

| | | | <i>Bloom's LL</i> | <i>COs</i> |
|---------------|---|--|-------------------|------------|
| <i>Q. No.</i> | <i>Questions</i> | | | |
| 1 | Demonstrate the Smart City Security Architecture. | | L3 | CO5 |
| 2 | Demonstrate the Raspberry Pi board with neat diagram. | | L3 | CO5 |
| 3 | Demonstrate the case study of Connected Street Lighting with respect to Smart City. | | L3 | CO5 |
| 4 | How can you differentiate between Raspberry Pi and Arduino. | | L4&L5 | CO5 |
| 5 | How to install Arduino software for the windows PCs? | | L4&L5 | CO5 |

Note:

- Questions shall be framed by consolidating comprehensively from the following sources
 - Exercise problems of text books/ references
 - Previous year question VTU exam Question paper. (Mark the year/exam beside the question)
 - Questions by Experts during Interview/Academic Audit
 - Internet sources/ other Universities examination question papers.
 - Own / experience.
- Questions shall follow all the Bloom's learning levels with appropriate action verbs
- There shall be a total of 25 questions considering 5 questions from each module, of which, 3 questions at L3, 2 questions each at L4/L5.
- Ensure the coverage of all COs
- Rubrics to be specified for all assignment questions.

|| Jai Sri Gurudev ||

S.J.C INSTITUTE OF TECHNOLOGY

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Subject: Internet of Things Technology (17CS81)

Semester: 8th A & B

Faculty Name: Anand Tilagul&Chethan H V

Date: 24-05-2021

Tutorial - I

1. What is IoT? With a diagram explain Genesis of IoT.
2. Compare IoT and Digitization with examples.
3. Mention Impact of IoT.
4. Write a note on the following: a) Connected Roadways b) Connected factory c)connected Buildings d) Smart Creatures.
5. Compare Operational Technology (OT) with Information Technology (IT).
6. What are the IoT Challenges, Explain Briefly.
7. Explain IoT Architectural Drivers.
8. With diagram Explain main elements of oneM2M IoT Architecture.
9. Explain briefly IoT Reference model Published by IoT World Forum.
10. Write expanded view of Simplified IoT Architecture. Explain briefly a) Core IoT Functional Stack b)IoT Data management & Compute Stack.
11. Explain Access Network Sublayer.
12. What do you mean by Fog Computing.
13. Explain the 2 types of gateway and backhaul sublayers.
14. What is edge computing? Explain with example.
15. Illustrate the hierarchy of edge, fog and cloud with a neat diagram.

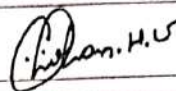
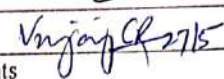
Chethan.H.V

Vijay



Internal Test Question paper format- CBCS Scheme

Name of the Staff: ANAND TILAGUL ,CHETHAN H V

Date: 27/05/2021 Signature: Reviewer's Signature: 

NOTE: Only the following information's to be given to the students

S.J.C. Institute of Technology

Department of Information Science and Engineering

Test: I

Subject Name & Code: Internet of Things Technology (17CS81)

Semester: VIII A& B Duration: 100 minutes Max Marks: 50

Answer the following questions by selecting one full question from each part.

| Question Number | | Marks | CO | Level |
|-----------------|---|-------|-----|-------|
| 1 | What is IOT? With a diagram explain Genesis of IOT. | 10 | CO1 | L2 |
| Or | | | | |
| 2 | What are the IOT Challenges and their impact with any one example? | 10 | CO1 | L2 |
| 3 | With diagram explain main elements of one M2M IOT Architecture. | 10 | CO1 | L2 |
| Or | | | | |
| 4 | Explain briefly IOT Reference model Published by IOT World Forum. | 10 | CO1 | L2 |
| 5 | What is Fog Computing? Explain with example. | 10 | CO1 | L2 |
| Or | | | | |
| 6 | What is edge computing? Explain with example. | 10 | CO1 | L2 |
| 7 | Explain in detail the expanded simplifies IOT Architecture. | 10 | CO1 | L2 |
| Or | | | | |
| 8 | Illustrate the hierarchy of edge, fog and cloud with a neat diagram. | 10 | CO1 | L2 |
| 9 | a) Explain Access Network Sublayers with neat diagram. | 5 | CO1 | L2 |
| | b) Explain the functionality of IOT network management Sublayers. | 5 | CO1 | L2 |
| Or | | | | |
| 10 | a) Explain Core IOT Functional Stack. | 5 | CO1 | L2 |
| | b) Compare Operational Technology (OT) with Information Technology(IT). | 5 | CO1 | L2 |

|| Jai Sri Gurudev ||
S.J.C INSTITUTE OF TECHNOLOGY
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Tutorial - II

Subject: Internet of Things Technology (17CS81)

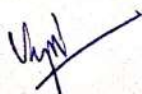
Semester: 8th A & B

Faculty Name: AnandTilagul&Chethan H V

Date: 24-06-2021

1. Explain in detail the IEEE 802.15.4 wireless access technology.
2. Explain in detail the LoRaWAN technology.
3. Give the key advantages of Internet Protocol.
4. What is Adaptation and Adoption of IP ?
5. Explain the factors that trying to determine, which model Adaptation v/s Adoption is best suit for last-mile connectivity?
6. Explain the Need for IP Optimization by considering constrained nodes, networks & IP versions.
7. Write a note on following: (any one point)
 - a) Optimizing IP for IOT using an Adaption layer.
 - b) Comparison of IOT Protocol Stack Utilizing 6LoWPAN.
 - c) 6LoWPAN Header stack.
8. Explain Optimizing IP for IOT. (any 3 out of 7 points).
9. Write a note on: i) Header Compression ii) Fragmentation iii) Mesh addressing iv) 6TiSCH v) RPL vi) Authentication & Encryption on Constrained nodes. (any one point)
10. Explain Constrained Application Protocol (CoAP) along with its message format and message field.
11. Explain Message Queuing Telemetry Transport (MQTT) along with its message format and message types.
12. Explain Protocol stack for Transporting Serial DNP3 SCADA over IIP.
13. Explain the various network topologies with examples.
14. Explain the classification of smart objects with examples.
15. What is IEEE 802.15.4 protocol? How is it related to IoT?
16. Classify different types of sensors with examples.
17. What is an actuator? Explain how sensors and actuators interact with the physical world.
18. Classify the actuator, with examples.
19. With a neat diagram, explain the characteristics of smart objects. List the trends in smartobjects.
20. What are SANETs? List its advantages.
21. List and explain different communication criterias in IoT.
22. Explain LoRaWAN layers and its architecture





Internal Test Question paper format- CBCS Scheme
Name of the Staff: ANAND TILAGUL , CHETHAN H V
Date: 28/06/2021

Signature: 
Reviewer's Signature:


NOTE: Only the following information's to be given to the students

S.J.C. Institute of Technology
Department of Information Science and Engineering
Test: II
Subject Name & Code: Internet of Things Technology (17CS81)
Semester: VIII A & B
Duration: 100 minutes
Max
Marks: 50
Answer the following questions by selecting one full question from each part.

| Question Number | | Marks | CO | Level |
|-----------------|---|-------|-----|-------|
| 1 | Explain in detail the IEEE 802.15.4 wireless access technology. | 10 | CO2 | L2 |
| Or | | | | |
| 2 | Explain in detail the LoRaWAN technology. | 10 | CO2 | L2 |
| 3 | Explain the various network topologies with examples. | 10 | CO2 | L2 |
| Or | | | | |
| 4 | Classify different <u>types</u> of sensors with examples. | 10 | CO2 | L2 |
| 5 | Explain Constrained Application Protocol (CoAP) along with its message format and message field. | 10 | CO3 | L2 |
| Or | | | | |
| 6 | Explain Message Queuing Telemetry Transport (MQTT) along with its message format and message types. | 10 | CO3 | L2 |
| 7 | Explain the Need for IP Optimization by considering constrained nodes, networks & IP versions. | 10 | CO3 | L2 |
| Or | | | | |
| 8 | Explain Protocol stack for Transporting Serial DNP3 SCADA over IIP. | 10 | CO3 | L2 |
| 9 | Give the key advantages of Internet Protocol. | 10 | CO3 | L2 |
| Or | | | | |
| 10 | Explain the Header Compression, Fragmentation and Mesh addressing. | 10 | CO3 | L2 |

|| Jai Sri Gurudev ||
S.J.C INSTITUTE OF TECHNOLOGY
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

Tutorial - III

Subject: Internet of Things Technology (17CS81)

Faculty Name: Anand T and Chethan H V

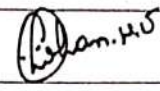

Semester: 8th A & B

Date: 07-07-2021

1. Explain 4 data analysis results and IOT data Analytics challenges.
2. With diagram explain Lambda Architecture for Parallel data flow.
3. Discuss some common challenges faced in OT security.
4. Explain Machine Learning concept along with its types.
5. With logical frame work show how the Purdue Model for control hierarchy is applied for Manufacturing.
6. Explain any 2 Big data analytics tools and technologies (MPP/NoSQL/Hadoop).
7. Discuss OCTAVE and FAIR formal risk analysis.
8. Explain in detail how IT and OT security practices and systems vary in real time.
9. Explain details of Arduino UNO hardware, software & programming.
10. Explain details of Rasberry Pi hardware, software & programming.
11. With a neat diagram explain wireless temperature monitoring system using Rasberry Pi.
12. Explain in detail smart city IOT architecture.
13. Write a note on following:
 - a) Connected Street Light with respect to Smart City
 - b) Smart City Security Architecture



Internal Test Question paper format- CBCS Scheme
Name of the Staff: ANAND TILAGUL , CHETHAN H V
Date: 15/07/2021

Signature: 
Reviewer's Signature: 

NOTE: Only the following information's to be given to the students

S.J.C. Institute of Technology
Department of Information Science and Engineering
Test: III

Subject Name & Code: Internet of Things Technology (17CS81)

Semester: VIII A & B

Duration: 100 minutes

Max Marks: 50

Answer the following questions by selecting one full question from each part.

| Question Number | | Marks | CO | Level |
|-----------------|--|-------|-----|-------|
| 1 | Discuss OCTAVE and FAIR formal risk analysis | 10 | CO4 | L2 |
| Or | | | | |
| 2 | With logical frame work show how the Purdue Model for control hierarchy is applied for Manufacturing | 10 | CO4 | L2 |
| 3 | Explain in detail how IT and OT security practices and systems vary in real time. | 10 | CO4 | L2 |
| Or | | | | |
| 4 | Explain any 2 Big data analytics tools and technologies (MPP/NoSQL/Hadoop). | 10 | CO4 | L2 |
| 5 | Explain Machine Learning concept along with its types | 10 | CO4 | L2 |
| Or | | | | |
| 6 | With diagram explain Lambda Architecture for Parallel data flow | 10 | CO4 | L2 |
| 7 | Explain details of Arduino UNO hardware, software & programming. | 10 | CO5 | L3 |
| Or | | | | |
| 8 | Explain details of Rasberry Pi hardware, software & programming. | 10 | CO5 | L3 |
| 9 | With a neat diagram explain wireless temperature monitoring system using Rasberry Pi. | 10 | CO5 | L3 |
| Or | | | | |
| 10 | Explain in detail smart city IOT architecture. | 10 | CO5 | L3 |

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Internet of Things and Technology

Time: 3 hrs.

Max. Marks: 80

*Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

- 1 a. Define IoT and discuss the Genesis of IoT in detail. (04 Marks)
- b. List out the difference between IT and OT networks and their various challenges. (06 Marks)
- c. List out the most significant challenges and problems that IoT is currently facing. (06 Marks)
- 2 a. List and explain the defining characteristics of fog computing. (06 Marks)
- b. Explain the IoT reference model published by the IoTWF. (10 Marks)

Module-2

- 3 a. Define sensor and its characteristics. (06 Marks)
- b. List out the most useful classification scheme for the pragmatic application of sensors in a IoT network. (10 Marks)
- 4 a. Briefly describe about communication criteria. (08 Marks)
- b. What are the main topologies used for IoT connecting devices? (08 Marks)

Module-3

- 5 a. What are the key advantages of the IP suite for the IoT? (10 Marks)
- b. What are the points to be considered while comparing the transport of DLMS/COSEM over a cellular network versus an LLN deployment? (06 Marks)
- 6 a. Explain in detail COAP message format. (08 Marks)
- b. Explain Message Queuing Telemetry Transport (MQTT). (08 Marks)

Module-4

- 7 a. What are the ways IoT data is categorized? Explain in detail. (06 Marks)
- b. Discuss the following :
 - (i) Supervised learning
 - (ii) Unsupervised learning
 - (iii) Neural Networks. (10 Marks)
- 8 a. Explain any two Big data analytics tools and technologies. (10 Marks)
- b. Explain Lambda Architecture in details. (06 Marks)

For More Question Papers Visit - www.pediawikiblog.com

Module-5

- 9 a. What is Arduino? What are the advantages of Arduino? (06 Marks)
b. How to install arduino software for the windows PCs? (10 Marks)
- 10 a. Distinguish between Raspberry Pi and Arduino. (04 Marks)
b. Develop a python program which monitors a temperature of an engine using DS18B20 sensor and Raspberry Pi. (12 Marks)

Module-5

9 a. Explain the following with respect to Arduino programming.

- i) Structure
- ii) Functions
- iii) Variables
- iv) Flow control statements
- v) Data type
- vi) Constants.

(08 Marks)

(08 Marks)

b. Explain Raspberry Pi learning board.

OR

10 a. Write a python program on Raspberry Pi to blink an LED.

(06 Marks)

b. Explain Smart city security architecture.

(06 Marks)

c. Write a short note on :

- i) IOT challenges
- ii) Backhaul Technologies.

(04 Marks)

SJCIT/NBA/
CO-PO-PSO REPT/
2020-21



S J C INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

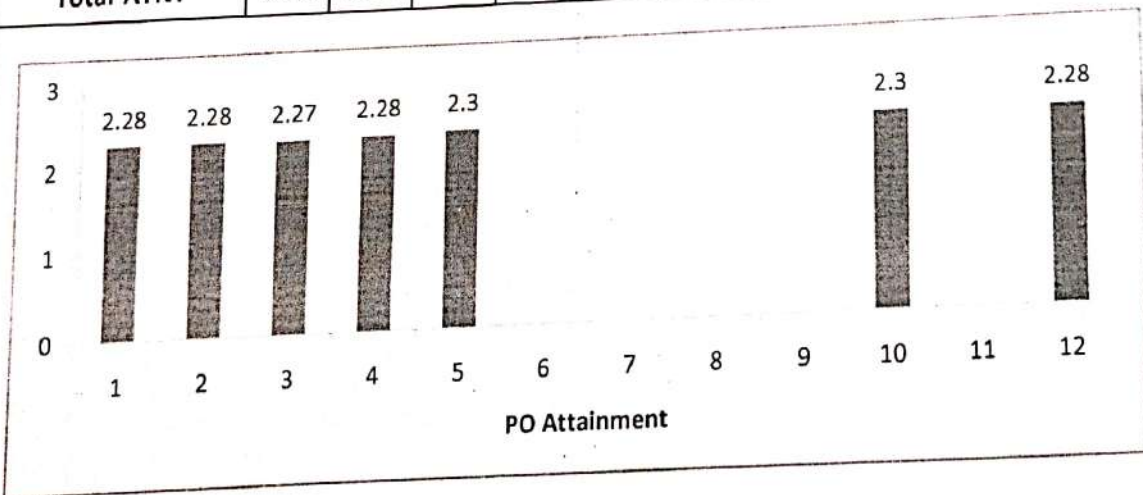
| | | | | | | | |
|--------------|--------|-------------------------------|---|---------|-------|-------------|------|
| Course Title | | Internet of Things Technology | | | | Course Code | C411 |
| Subject Code | 17CS81 | Semester | 8 | Section | A & B | Emp.ID | 2095 |
| Faculty Name | | Anand Tilagul & Chethan H V | | | | No.students | 76 |

Summary of CO attainments of Sub: 17CS81 Based on (ACTUAL-TYPE-1) Academic Year:2020-21

| CO | CID_CO | CIE | | | SEE | | | CES | | | TOT_Attainment | | |
|-----|--------|------|------|-----|------|------|-----|------|------|-----|----------------|----|--------|
| | | S_AT | T_ST | ATN | S_AT | T_ST | ATN | S_AT | T_ST | ATN | ATN | % | Status |
| CO1 | C411.1 | 76 | 76 | 3 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.3 | 75 | YES |
| CO2 | C411.2 | 76 | 76 | 3 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.3 | 75 | YES |
| CO3 | C411.3 | 76 | 76 | 3 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.3 | 75 | YES |
| CO4 | C411.4 | 73 | 76 | 2.9 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.2 | 74 | YES |
| CO5 | C411.5 | 76 | 76 | 3 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.3 | 75 | YES |
| CO6 | C411.6 | 76 | 76 | 3 | 39 | 76 | 1.5 | 67 | 67 | 3 | 2.3 | 75 | YES |

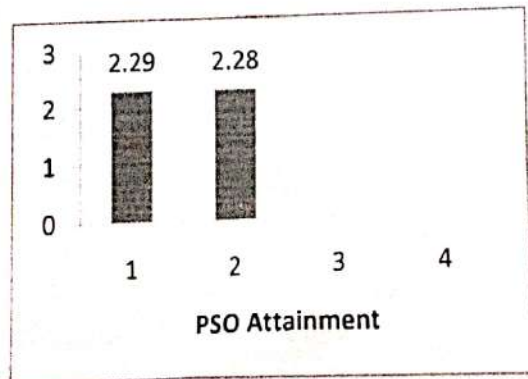
Summary of PO attainments of Sub: 17CS81 Based on (ACTUAL-TYPE-1) Academic Year:2020-21

| PO Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|------|------|------|------|------|---|---|---|---|------|----|------|
| Direct ATNT(D) | 2.16 | 2.16 | 2.15 | 2.16 | 2.17 | | | | | 2.17 | | 2.16 |
| Indirect ATNT(ID) | 3 | 3 | 3 | 3 | 3 | | | | | 3 | | 3 |
| Total-ATNT | 2.28 | 2.28 | 2.27 | 2.28 | 2.3 | | | | | 2.3 | | 2.28 |



Summary of PSO attainments in Year:2020-21

| PSO Number | 1 | 2 | 3 | 4 |
|-------------------|------|------|---|---|
| Direct ATNT(D) | 2.16 | 2.16 | | |
| Indirect ATNT(ID) | 3 | 3 | | |
| Total-ATNT | 2.29 | 2.28 | | |



SJCIT/NBA/
CER/
2020-21



S J C INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

A. Course Details

| | | | | | | | |
|----------------------|-------------------------------|-------------|-----------------|---------|-----------------|-----------|----|
| Course Title | Internet of Things Technology | | | | Course Code | C411 | |
| Subject Code | 17CS81 | Semester | 8 | Section | A & B | Programme | UG |
| Course | Theory | Course Type | CORE | | No. of students | 76 | |
| Date of commencement | 19-4-21 | | Date of Closure | | | 20-7-21 | |

B. Course Instructor Details

| | | | | |
|---------------------------|-----------------------------|---------------------------------|--------|------|
| Course Instructor Name | Anand Tilagul & Chethan H V | | Emp.ID | 2095 |
| Total Teaching Experience | 04 | No. of times taught this course | | 1 |

C. Course Delivery

| | | | | | | |
|---|--|-----|--------------|----|---|-----|
| 1 | Course Plan was circulated among students before the start of course | YES | | | | |
| 2 | Total No of Modules/Chapters the course consists | 5 | Covered | 5 | % | 100 |
| 3 | Total No of Classes Planned for the course | 50 | Classes Held | 50 | % | 100 |
| 4 | Any reasons for non-coverage of 100 % syllabus (if not covered) | | | | | |

Syllabus Covered.

D. Course Outcome(s) & University Examination Results

| | | | | | | |
|--------------------------------|--|----|------|-------|-------|---------|
| University Examination Results | | | | | 76 | |
| 1 | Appeared | 76 | Pass | 76 | %Pass | 100 |
| 2 | Lost eligibility due to shortage of attendance | | | -NIL- | % | #VALUE! |
| 3 | No. of students obtained minimum CIE marks | | | 0 | % | 0 |

Grades obtained by the students (No. of students)

| Grade Letter | S | A | B | C | D | E | E | Marks | Max. | Avg. |
|-----------------|-------------|----|----|----|---|---|---|-------|------|------|
| | Grade Point | 10 | 9 | 8 | 7 | 6 | 4 | | | |
| No. of Students | 1 | 15 | 38 | 19 | 3 | | | SEE | 60 | 35 |
| % Students) | 1 | 20 | 50 | 25 | 4 | | | Total | 100 | 74 |



Summary of Course Outcomes

| Weight, % | Attainment | | | | Blooms Levels | |
|-----------|------------|-----|-----|-------|---------------|-----|
| | 40 | 50 | 10 | | Level's | No. |
| CO-Number | CIE | SEE | CES | Total | | |
| C411.1 | 3 | 1.5 | 3 | 2.3 | Apply | 3 |
| C411.2 | 3 | 1.5 | 3 | 2.3 | Analyse | 4 |
| C411.3 | 3 | 1.5 | 3 | 2.3 | Apply | 3 |
| C411.4 | 2.9 | 1.5 | 3 | 2.2 | Apply | 3 |
| C411.5 | 3 | 1.5 | 3 | 2.3 | Apply | 3 |
| C411.6 | 3 | 1.5 | 3 | 2.3 | Analyse | 4 |

E. Students Feedback

Over all feedback value 98.2%

F. Remarks on CIE, attainment and suggestion(s) to improve course delivery by course instructor

All Co's are attained.

G. Innovative/Best methods used for course delivery by the course instructor


* Chalk & Talk
* PPT'S & videos.


H. Remarks of the Module Coordinator

All the Co's are attained. Suggested to Increase the target level for all Co's.

Signature
Name

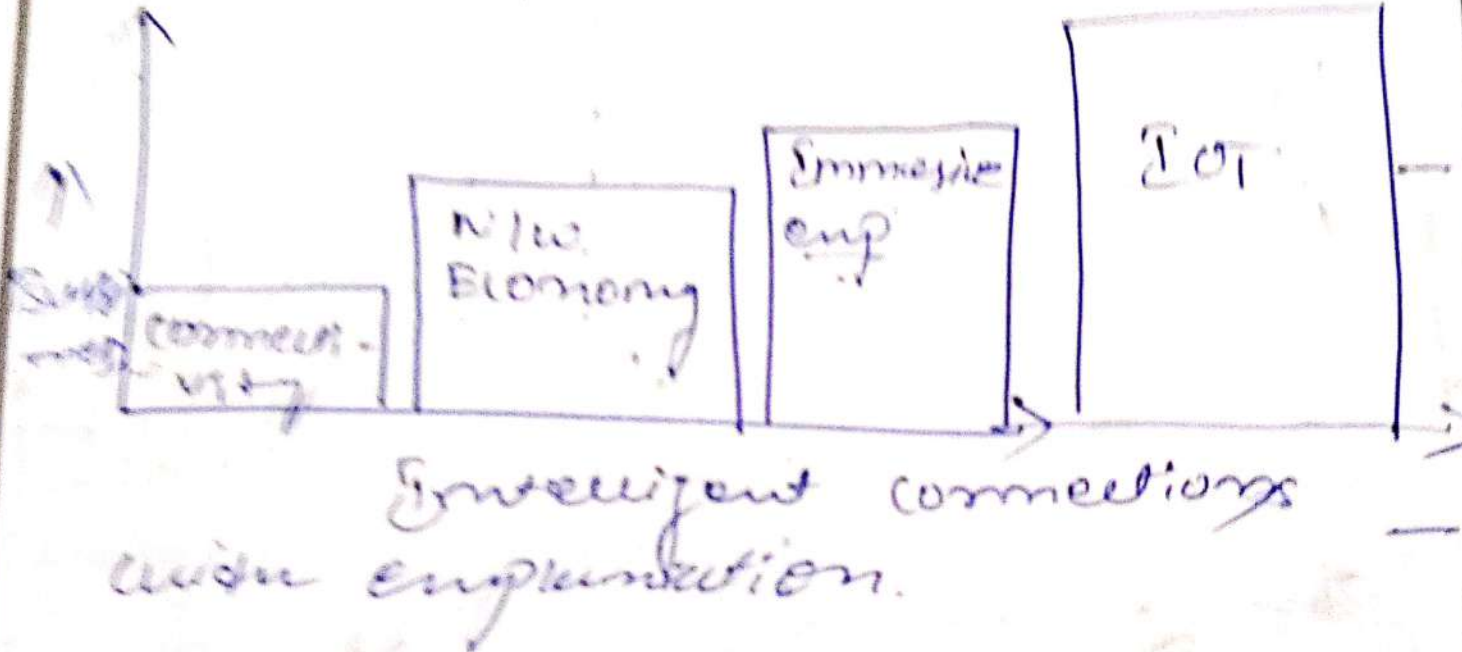

Anand Tilagul
Module Coordinator


Anand Tilagul & Chethan H V
Course Instructor


Signature of the HOD 28/5/21

Solution

Also the ways of expansion of DOT
→ ways of DOT
→ forms of DOT



DOT Challenges

- Safety
- mobility
- Environment
- priority
- operational fees

with example.

Subject Title: IOT

Subject Code: 18IS2

| Question Number | Solution | Subject |
|-----------------|---|------------|
| (31)(4) | <p>main elements of an m2m <u>Arch</u></p> <p>with explanation.</p> | <p>6m</p> |
| (41)(a) | <p>IOT reference model published by IETF world forum</p> <ol style="list-style-type: none"> 7 → 1011 observation & process 6 → Application (Reporting, Analytics) 5 → Data abstraction (Aggregation) → 4 → Data accumulation (Storage) 3 → Edge computing (Data element analysis) 2 → Connectivity (communications) 1 → Physical devices & controllers (things in IOT) <p>Implementation of all layers →</p> | <p>10m</p> |

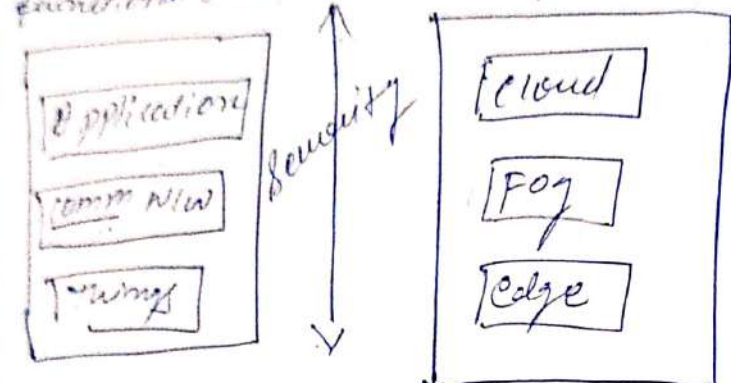
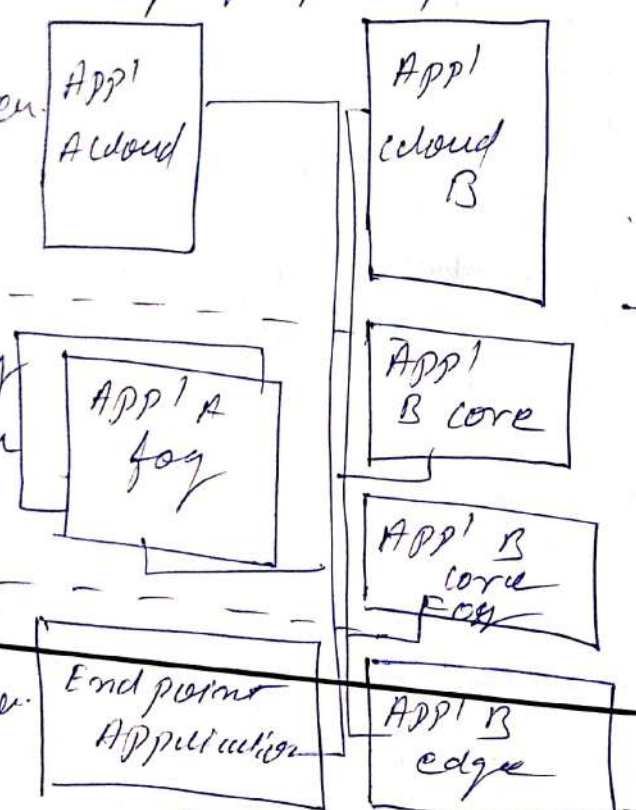
Subject Title:

Subject Code:

| Question Number | Solution | Marks Allocated |
|-----------------|---|--|
| (5)(a) | <p><u>Fog computing</u></p> <p>Structure of Datacenter.</p> <p>The diagram illustrates the layers of fog computing. At the top is the 'Datacenter/Cloud' layer, represented by a cloud icon. Below it is the 'Core & DC' layer, consisting of two server racks connected by a 'core & DC' link. The next layer is the 'Fog layer', also with two server racks connected by a 'Fog layer' link. At the bottom is the 'Smart Objects' layer, represented by two cloud-like icons connected by a 'Smart Objects' link. Arrows indicate bidirectional communication between adjacent layers. To the left of each layer is a label: 'Structure of Datacenter' for the top layer, 'Structure Backbone' for the Core & DC layer, 'Multi Service edge' for the Fog layer, and 'Embedded System with information' for the Smart Objects layer.</p> | <p>4m</p> <p>6m</p> <hr/> <p>10m.</p> |
| 6)(a) | <p><u>Edge computing</u></p> <p>Edge computing layer explanation.</p> <p>The diagram shows two endpoints, 'Endpoint APP'A' and 'Endpoint APP'B'. Each endpoint is represented by a large box containing two smaller boxes: 'APP' and 'Database'. Below each of these boxes are 'OS' and 'VM' labels. A line connects the two endpoints, representing communication. Below the diagram is the word 'Explanation'.</p> | <p>2m</p> <p>8m</p> <hr/> <p>10 m.</p> |

Subject Title: _____

Subject Code: _____

| Question Number | Solution | Marks Allotted |
|---|--|--------------------------|
| <p>(2)(a) Summarized IoT architecture functional stack.</p> | <p>IoT Data management & compute stack.</p>  <p>Empowerment of all the layers</p> | <p>3m 7m 10m</p> |
| <p>(2)(a) Hierarchy of edge, fog & cloud</p> |  <p>Cloud layer</p> <p>Fog layer</p> <p>Edge layer</p> <p>Empowerment</p> | <p>4m 6m</p> |

Subject Title: IoT

Subject Code: 17 CSS

| Question Number | Solution | Marks Allocated |
|-----------------|--|-----------------|
| (9) (a) | <p><u>Access N/w Sublayers</u></p> <p>2m</p> <p>4m</p> <p>6m</p> | |
| (9) (b) | <p><u>Functionality of IoT N/w management Sublayers</u></p> <p>→ Data analytics → 2m</p> <p>→ Network analytics → 2m</p> | <p>4m</p> |
| (10) (a) | <p><u>Core of IoT functional stack</u></p> <p>→ Security layer.</p> <p>→ Communication & N/w layer</p> <p>→ Access network layer.</p> <p>→ Gateways & Backend n/w layer.</p> <p>→ N/w Transport layer.</p> | <p>6m</p> |
| | <p>→ IoT network management layer</p> <p>→ Application Analytics layer.</p> | <p>6m</p> |

Subject Title: IOT

| Question Number | Evaluation |
|-----------------|---|
| 10(b) | <p>Differences b/w OT & IT</p> <ul style="list-style-type: none">-> <u>Criteria</u>-> operational factors-> Production-> types of base-> Secondary |



DEPARTMENT : Information Science & Engineering

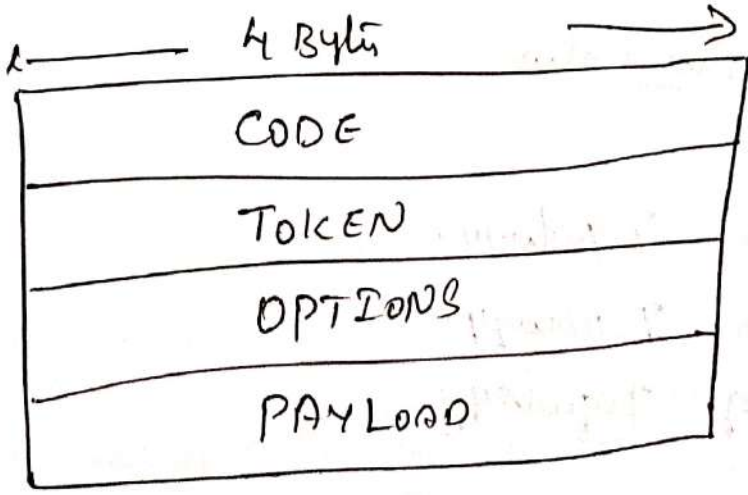
TEST-II Scheme & Solutions

Sem : VIII

Subject Title: Internet of Things, 17CS81

| Question Number | Solution | Marks Allocated |
|-----------------|---|--|
| 1. | <ul style="list-style-type: none"> * Types of Deployments. * Standardization & Alliances. * Protocol Stack. * ZigBee | 2 marks 2 marks 4 marks 2 marks 10 marks |
| 2. | <p>LoRAWAN standardization & Alliances. - 2m -</p> <p>LoRAWAN layers.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">Applications</p> <hr/> <p style="text-align: center;">IPV6</p> <hr/> <p style="text-align: center;">MAC</p> <hr/> <p style="text-align: center;">PHY MODULATION.</p> <hr/> <p style="text-align: center;">ALLIANCE.</p> </div> <p style="margin-top: 20px;"><u>Explanation:-</u></p> | - 2m - - 10m - - 6m - |
| 3. | <p>Star Topology.</p> <p>Mesh Topology.</p> <p>Ring Topology.</p> | 10m - |



| Question Number | Solution | Marks Allocated |
|-----------------|--|-----------------|
| 4. | <p>Sensor Types. 1x10</p> <ul style="list-style-type: none"> * Position * Occupancy & Motion. * Velocity & Acceleration * FORCE * Pressure. * Flow * Humidity * Light * Radiation. * Temperature | 10M. |
| 5. | <p>Constrained Application Protocol (Coap). 2m- standards Coap: Coap message format & message fields with Diagram. - 8m-</p> <div style="text-align: center;">  <pre> graph TD subgraph CoAP_Message_Format [CoAP Message Format] direction TB CODE[CODE] TOKEN[TOKEN] OPTIONS[OPTIONS] PAYLOAD[PAYLOAD] end </pre> </div> | -10M- |



| Question Number | Solution | Marks Allocated |
|--|--|-----------------|
| | <div style="text-align: right; margin-bottom: 10px;">-5M-</div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">MASTER</div> <p>↓</p> <p>Application layer</p> <p>↓</p> <p>Transportation</p> <p>↓</p> <p>Data link</p> <p>↓</p> <p>CM</p> <p>↓</p> <p>Transport</p> <p>↓</p> <p>Network</p> <p>↓</p> <p>Data link layer.</p> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 0 auto;">OUT STATION</div> <p>↓</p> <p>DMP3 Application layer</p> <p>↓</p> <p>Transport</p> <p>↓</p> <p>Data link layer.</p> <p>↓</p> <p>Connection Manager</p> <p>↓</p> <p>Transport</p> <p>↓</p> <p>Network</p> <p>↓</p> <p>Data link Physical</p> </div> </div> <p style="text-align: center; margin-top: 10px;">Logical communication. ↔</p> | <p>-10M</p> |
| <p>9. <u>Advantages of IP:-</u></p> <ul style="list-style-type: none"> * Open & Standard Base. * Versatile * Scalable * Managable * Stable * Innovation factor | <div style="text-align: right; margin-bottom: 10px;">-5M-</div> <div style="text-align: right; margin-bottom: 10px;">5x2</div> | <p>-10M</p> |



| Question Number | Question | Marks Allocated |
|-----------------|---|-------------------------------|
| 10 | Header Compression * Fragmentation * Mesh Addressing with Explanation. | 5 M 3 M 4 M = 12 M = |

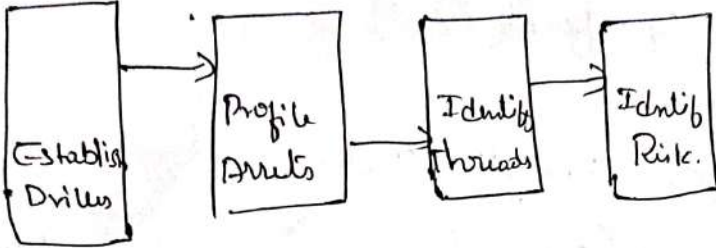
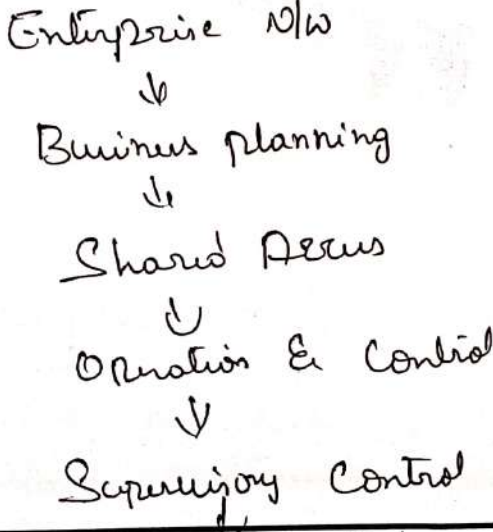


DEPARTMENT :Information Science & Engineering

TEST-III Scheme & Solutions

Subject Title:Internet of Things,17CS81

Sem : VIII

| Question Number | Solution | Marks Allocated |
|-----------------|--|--------------------------------------|
| 1. | <p><u>OCTAVG</u> :-</p>  <pre> graph LR A[Establish Drives] --> B[Profile Assets] B --> C[Identify Threats] C --> D[Identify Risk.] </pre> <p>Explanation:-</p> <p><u>FAIR</u> :-</p> <p>Explanation</p> | <p>-5m-</p> <p>-10m-</p> <p>-5m-</p> |
| 2. | <p><u>Purdue Model Control Hierarchy.</u></p>  <pre> graph TD A[Enterprise NW] --> B[Business planning] B --> C[Shared Access] C --> D[Operation & Control] D --> E[Supervisory Control] E --> F[Basic Control] F --> G[Process] G --> H[Safety Control] </pre> <p>with Explanation -5m-</p> | <p>-5m-</p> <p>-10m-</p> |



| Question Number | Solution | Marks Allocated |
|-----------------|--|-----------------|
| 3. | <p><u>IT & OT Security Practices.</u></p> <p>* Purdue Model for Control Hierarchy. -3m-</p> <p>* OT N/w Characteristics Impacting Security -3m-</p> <p>* Security Properties. -2m-</p> <p>* Security focus. -2m-</p> | -10m- |
| 4. | <p><u>Big data Analytics Tools.</u></p> <p>* NO SQL Database. -4m-</p> <p>* Hadoop -4m-</p> <p>* MPP -2m-</p> | -10m- |
| 5. | <p><u>Machine Learning Overview.</u></p> <p>* Supervised Learning. 5x2</p> <p>* Unsupervised Learning.</p> <p>* Neural N/w's.</p> <p>* Intelligence</p> <p>* Predictive Analytics.</p> | -10m- |



| Question Number | Solution | Marks Allocated |
|-----------------|---|--|
| 6. | <p><u>Lambda Architecture</u></p> <pre> graph LR SO[Smart Objects] --> K[Kafka] K --> SL[Stream layer] K --> BL[Batch layer] SL --> RV[Realtime view] BL --> PCV[Pre-compute views] PCV --> SL SL --> S[Streaming layer] BL --> S </pre> <p>Explanation:-</p> | <p>-10M-</p> <p>-5M-</p> <p>-5M-</p> |
| 7. | <p><u>Arduino UNO Hardware</u></p> <p>Hardware Types.</p> <p>SW Types</p> <p>Programming Types.</p> <p>Arduino layout.</p> | <p>-3M-</p> <p>-3M-</p> <p>-2M-</p> <p>-2M-</p> <p>-10M-</p> |
| 8. | <p><u>Raspberry Pi:-</u></p> <p>Hardware types</p> <p>Software type.</p> | <p>-5M-</p> <p>-5M-</p> <p>-10M-</p> |



| Question Number | Solution | Marks Allocated |
|-----------------|--|-----------------|
| 10. | <p><u>Smart City</u> <u>IoT</u> Architecture - SR2</p> <ul style="list-style-type: none">* Smart City layered Architecture* Street layer.* City layer.* Data Center layer.* Service layer.* ON premises | -10M- |

SJOT/NBA/
CIE-MARKS/
2020-21



SJG INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

Course Title:

Internet of Things Technology

Subject Code:

17CS81

Semester & Section

B - A & B

No.Students

76

Course Instructor Name:

Anand Tilagul & Chethan H V

Course ID:

C411

Test No:1

Ref-Question Number:

1

2

3

4

5

6

7

8

9

10

CIE Marks Entry Format For the Academic Year - 2020-21

Questions

1,2

3,4

5,6

7,8

9,10

11

Main Question No.

1

3

5

7

9

11

Mapped CO-No.

1

1

1

1

1

5

Sl.

USN/Q-Marks

10

10

10

10

10

10

1

1SJ17S001

10

10

10

10

10

10

2

1SJ17S002

10

10

7

10

10

10

3

1SJ17S003

10

10

10

10

8

10

4

1SJ17S004

10

10

10

10

10

10

5

1SJ17S005

10

10

10

10

7

10

6

1SJ17S007

10

10

10

10

8

10

7

1SJ17S008

10

10

10

10

9

10

8

1SJ17S009

10

10

10

10

7

10

9

1SJ17S011

10

10

10

10

8

10

10

1SJ17S012

10

10

10

10

9

10

11

1SJ17S013

10

10

10

10

8

10

12

1SJ17S015

10

10

10

10

10

10

13

1SJ17S017

10

10

10

10

10

10

14

1SJ17S020

10

10

10

10

10

10

15

1SJ17S021

10

10

10

10

8

10

16

1SJ17S022

10

10

10

10

10

10

17

1SJ17S023

10

10

10

10

8

10

18

1SJ17S024

10

10

10

10

10

10

19

1SJ17S025

10

10

10

10

7

10

20

1SJ17S026

10

10

10

10

7

10

21

1SJ17S027

10

10

10

10

9

10

22

1SJ17S028

10

10

10

10

8

10

23

1SJ17S029

10

10

10

10

8

10

24

1SJ17S030

10

10

10

10

10

10

25

1SJ17S031

10

10

10

10

10

10

26

1SJ17S033

10

10

10

10

8

10

27

1SJ17S034

10

10

10

10

9

10

28

1SJ17S035

10

10

10

10

9

10

29

1SJ17S036

10

10

10

10

10

10

30

1SJ17S037

10

10

10

10

8

10

31

1SJ17S038

10

10

10

10

7

10

32

1SJ17S039

10

10

10

10

SJOT/NBA/
CIE-MARKS/
2020-21



S J INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

Course Title:

Internet of Things Technology

Subject Code:

17CSB1

Semester & Section

B - A & B

No.Students

76

Course Instructor Name:

Anand Tilagul & Chethan H V

Course ID:

C411

Test No:1

Ref-Question Number:

1

2

3

4

5

6

7

8

9

10

CIE Marks Entry Format For the Academic Year - 2020-21

| Questions | 1,2 | 3,4 | 5,6 | 7,8 | 9,10 | 11 | | | | |
|--------------------------|--------------------|-----|-----|-----|------|----|--|--|--|--|
| Main Question No. | 1 | 3 | 5 | 7 | 9 | 11 | | | | |
| Mapped CO-No. | 1 | 1 | 1 | 1 | 1 | 5 | | | | |
| Sl. | USN/Q-Marks | | | | | | | | | |
| 36 | 1SJ17IS044 | 10 | 10 | 10 | 10 | 10 | | | | |
| 37 | 1SJ17IS045 | 10 | 10 | 10 | 10 | 8 | | | | |
| 38 | 1SJ17IS046 | 10 | 10 | 10 | 10 | 9 | | | | |
| 39 | 1SJ17IS049 | 10 | 10 | 9 | 10 | 8 | | | | |
| 40 | 1SJ17IS050 | 9 | 9 | 9 | 8 | 8 | | | | |
| 41 | 1SJ17IS051 | 10 | 10 | 10 | 10 | 8 | | | | |
| 42 | 1SJ17IS052 | 9 | 9 | 9 | 9 | 8 | | | | |
| 43 | 1SJ17IS054 | 9 | 9 | 10 | 9 | 6 | | | | |
| 44 | 1SJ17IS055 | 9 | 9 | 10 | 10 | 10 | | | | |
| 45 | 1SJ17IS056 | 10 | 10 | 10 | 9 | 0 | | | | |
| 46 | 1SJ17IS057 | 9 | 9 | 9 | 8 | 8 | | | | |
| 47 | 1SJ17IS059 | 10 | 10 | 10 | 10 | 8 | | | | |
| 48 | 1SJ17IS061 | 10 | 10 | 8 | 8 | 8 | | | | |
| 49 | 1SJ17IS062 | 10 | 10 | 10 | 10 | 8 | | | | |
| 50 | 1SJ17IS063 | 10 | 10 | 9 | 9 | 9 | | | | |
| 51 | 1SJ17IS064 | 10 | 10 | 10 | 10 | 8 | | | | |
| 52 | 1SJ17IS065 | 9 | 9 | 9 | 9 | 8 | | | | |
| 53 | 1SJ17IS066 | 8 | 8 | 8 | 10 | 10 | | | | |
| 54 | 1SJ17IS067 | 10 | 10 | 10 | 10 | 8 | | | | |
| 55 | 1SJ17IS068 | 10 | 10 | 10 | 10 | 8 | | | | |
| 56 | 1SJ17IS069 | 10 | 9 | 10 | 10 | 8 | | | | |
| 57 | 1SJ17IS070 | 10 | 10 | 9 | 9 | 8 | | | | |
| 58 | 1SJ17IS072 | 10 | 10 | 10 | 9 | 8 | | | | |
| 59 | 1SJ17IS073 | 10 | 10 | 9 | 8 | 5 | | | | |
| 60 | 1SJ17IS074 | 9 | 9 | 9 | 9 | 8 | | | | |
| 61 | 1SJ17IS076 | 10 | 10 | 10 | 9 | 8 | | | | |
| 62 | 1SJ17IS077 | 10 | 10 | 10 | 10 | 8 | | | | |
| 63 | 1SJ17IS078 | 10 | 10 | 10 | 10 | 8 | | | | |
| 64 | 1SJ17IS079 | 10 | 10 | 7 | 10 | 10 | | | | |
| 65 | 1SJ17IS080 | 10 | 10 | 10 | 10 | 9 | | | | |
| 66 | 1SJ17IS081 | 10 | 10 | 10 | 10 | 9 | | | | |
| 67 | 1SJ17IS082 | 10 | 10 | 10 | 10 | 8 | | | | |
| 68 | 1SJ17IS083 | 10 | 10 | 10 | 10 | 8 | | | | |
| 69 | 1SJ17IS084 | 10 | 10 | 10 | | 8 | | | | |
| 70 | 1SJ17IS085 | 10 | 10 | 9 | 9 | 8 | | | | |



Course Title:

Internet of Things Technology

Subject Code:

17CSB1

Semester & Section

B - A & B

No.Students

76

Course Instructor Name:

Anand Tilagul & Chethan HV

Course ID:

C411

Test No:2

Ref-Question Number:

11

12

13

14

15

16

17

18

19

20

CIE Marks Entry Format For the Academic Year - 2020-21

| Questions | 1,2 | 3,4 | 5,6 | 7,8 | 9,10 | 11 | | | | |
|-------------------|-------------|-----|-----|-----|------|----|----|--|--|--|
| Main Question No. | 1 | 3 | 5 | 7 | 9 | 11 | | | | |
| Mapped CO-No. | 2 | 2 | 3 | 3 | 3 | 6 | | | | |
| Sl. | USN/Q-Marks | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 1 | 1SJ17E001 | 10 | 10 | 10 | 10 | 9 | 10 | | | |
| 2 | 1SJ17E002 | 10 | 10 | 10 | 10 | 6 | 10 | | | |
| 3 | 1SJ17E003 | 10 | 10 | 10 | 10 | 9 | 10 | | | |
| 4 | 1SJ17E004 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 5 | 1SJ17E005 | 10 | 10 | 10 | 6 | 10 | 10 | | | |
| 6 | 1SJ17E007 | 10 | 10 | 10 | 8 | 10 | 10 | | | |
| 7 | 1SJ17E008 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 8 | 1SJ17E009 | 10 | 10 | 10 | 8 | 10 | 10 | | | |
| 9 | 1SJ17E011 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 10 | 1SJ17E012 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 11 | 1SJ17E013 | 10 | 10 | 10 | 10 | 7 | 10 | | | |
| 12 | 1SJ17E015 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 13 | 1SJ17E017 | 10 | 10 | 10 | 9 | 10 | 10 | | | |
| 14 | 1SJ17E020 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 15 | 1SJ17E021 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 16 | 1SJ17E022 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 17 | 1SJ17E023 | 10 | 10 | 10 | 8 | 10 | 10 | | | |
| 18 | 1SJ17E024 | 10 | 10 | 9 | 10 | 10 | 10 | | | |
| 19 | 1SJ17E025 | 10 | 6 | 10 | 10 | 10 | 10 | | | |
| 20 | 1SJ17E026 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 21 | 1SJ17E027 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 22 | 1SJ17E028 | 10 | 7 | 10 | 10 | 10 | 10 | | | |
| 23 | 1SJ17E029 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 24 | 1SJ17E030 | 10 | 9 | 10 | 10 | 10 | 10 | | | |
| 25 | 1SJ17E031 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 26 | 1SJ17E033 | 10 | 10 | 10 | 10 | 7 | 10 | | | |
| 27 | 1SJ17E034 | 10 | 10 | 10 | 10 | 9 | 10 | | | |
| 28 | 1SJ17E035 | 10 | 10 | 10 | 10 | 8 | 10 | | | |
| 29 | 1SJ17E036 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 30 | 1SJ17E037 | 10 | 7 | 10 | 10 | 10 | 10 | | | |
| 31 | 1SJ17E038 | 10 | 10 | 6 | 10 | 10 | 10 | | | |
| 32 | 1SJ17E039 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 33 | 1SJ17E041 | 10 | 10 | 10 | 10 | 7 | 10 | | | |
| 34 | 1SJ17E042 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 35 | 1SJ17E043 | 10 | 10 | 10 | 10 | 10 | 10 | | | |

**SJC INSTITUTE OF TECHNOLOGY**

Chickballapur - 562 101

Department of Information Science & Engineering

SJCIT/NBA/
CIE-MARKS/
2020-21**Course Title:**

Internet of Things Technology

Subject Code:

17CSB1

Semester & Section

B - A & B

No.Students

76

Course Instructor Name:

Anand Tilagul & Chethan H V

Course ID:

C411

Test No:2**Ref-Question Number:**

11

12

13

14

15

16

17

18

19

20

CIE Marks Entry Format For the Academic Year - 2020-21**Questions**

1,2

3,4

5,6

7,8

9,10

11

Main Question No.

1

3

5

7

9

11

Mapped CO-No.

2

2

3

3

3

6

Sl.**USN/Q-Marks**

10

10

10

10

10

10

36

15J17IS044

10

10

10

10

9

10

37

15J17IS045

10

8

9

10

10

10

38

15J17IS046

10

10

9

10

9

10

39

15J17IS049

10

10

10

10

9

10

40

15J17IS050

10

9

10

10

9

10

41

15J17IS051

10

9

10

10

9

10

42

15J17IS052

10

9

10

10

9

10

43

15J17IS054

10

10

10

9

9

10

44

15J17IS055

10

10

10

9

9

10

45

15J17IS056

10

10

10

9

9

10

46

15J17IS057

10

10

10

9

9

10

47

15J17IS059

10

10

10

9

9

10

48

15J17IS061

10

8

10

10

9

10

49

15J17IS062

10

10

10

9

9

10

50

15J17IS063

10

10

10

9

9

10

51

15J17IS064

10

10

9

9

10

52

15J17IS065

10

10

10

9

9

10

53

15J17IS066

8

16

10

9

9

10

54

15J17IS067

10

10

10

9

9

10

55

15J17IS068

10

10

10

10

9

10

56

15J17IS069

10

10

10

9

9

10

57

15J17IS070

10

10

10

9

9

10

58

15J17IS072

10

10

10

10

9

10

59

15J17IS073

10

9

10

9

10

60

15J17IS074

10

10

9

10

9

10

61

15J17IS076

9

9

10

9

8

10

62

15J17IS077

10

10

10

9

9

10

63

15J17IS078

10

10

10

9

9

10

64

15J17IS079

10

10

10

9

9

10

65

15J17IS080

10

10

10

10

9

10

66

15J17IS081

10

10

10

10

9

10

67

15J17IS082

10

10

10

9

9

10

68

15J17IS083

10

10

10

9

9

10

69

15J17IS084

10

10

10

9

9

10

70

15J17IS085

10

10

10

9

9

10

SIGT/NBA/
CIE-MARKS/
2020-21



S J C INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

| | | | | | | | | | | | |
|--|--------------------|-------------------------------|-------------------------------|-----|-----|-------------------|-----------|--------------------|----|----|----|
| Course Title: | | Internet of Things Technology | | | | | | | | | |
| Subject Code: | | 17CS81 | Semester & Section | | | | B - A & B | No.Students | 76 | | |
| Course Instructor Name: | | Anand Tilagul & Chethan H V | | | | Course ID: | | C411 | | | |
| Ref-Question Number: | | Test No:3 | | | | | | | | | |
| | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| CIE Marks Entry Form at For the Academic Year - 2020-21 | | | | | | | | | | | |
| Questions | | 1,2 | 3,4 | 5,6 | 7,8 | 9,10 | 11 | 11 | | | |
| Main Question No. | | 1 | 3 | 5 | 7 | 9 | 11 | 11 | | | |
| Mapped CO-No. | | 4 | 4 | 4 | 5 | 5 | 5 | 6 | | | |
| Sl. | USN/Q-Marks | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 36 | 1SJ17IS044 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 37 | 1SJ17IS045 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | | | |
| 38 | 1SJ17IS046 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | | |
| 39 | 1SJ17IS049 | 10 | 0 | 10 | 10 | 9 | 10 | 10 | | | |
| 40 | 1SJ17IS050 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | | |
| 41 | 1SJ17IS051 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | | |
| 42 | 1SJ17IS052 | 10 | 10 | 9 | 10 | 9 | 10 | 10 | | | |
| 43 | 1SJ17IS054 | 10 | 9 | 10 | 9 | 9 | 10 | 10 | | | |
| 44 | 1SJ17IS055 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | | |
| 45 | 1SJ17IS056 | 10 | 10 | 9 | 9 | 10 | 10 | 10 | | | |
| 46 | 1SJ17IS057 | 9 | 0 | 10 | 10 | 10 | 10 | 10 | | | |
| 47 | 1SJ17IS059 | 9 | 10 | | 19 | 9 | 10 | 10 | | | |
| 48 | 1SJ17IS061 | 10 | 9 | 9 | 10 | 10 | 10 | 10 | | | |
| 49 | 1SJ17IS062 | 10 | 10 | 9 | | 10 | 10 | 10 | | | |
| 50 | 1SJ17IS063 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | | |
| 51 | 1SJ17IS064 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | | |
| 52 | 1SJ17IS065 | 10 | 9 | 10 | 10 | | 10 | 10 | | | |
| 53 | 1SJ17IS066 | 10 | 9 | 9 | 9 | 9 | 10 | 10 | | | |
| 54 | 1SJ17IS067 | 10 | 9 | 9 | 10 | 10 | 10 | 10 | | | |
| 55 | 1SJ17IS068 | 10 | 10 | 9 | 10 | 9 | 10 | 10 | | | |
| 56 | 1SJ17IS069 | 10 | 9 | 9 | 9 | | 10 | 10 | | | |
| 57 | 1SJ17IS070 | 10 | 9 | 10 | 10 | 9 | 10 | 10 | | | |
| 58 | 1SJ17IS072 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | | | |
| 59 | 1SJ17IS073 | 10 | 9 | 10 | 9 | 9 | 10 | 10 | | | |
| 60 | 1SJ17IS074 | 10 | 9 | 9 | 9 | 10 | 10 | 10 | | | |
| 61 | 1SJ17IS076 | 0 | 10 | 10 | 10 | 9 | 10 | 10 | | | |
| 62 | 1SJ17IS077 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | | |
| 63 | 1SJ17IS078 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | | |
| 64 | 1SJ17IS079 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | | | |
| 65 | 1SJ17IS080 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | | |
| 66 | 1SJ17IS081 | 10 | 10 | 10 | 9 | 10 | 10 | 10 | | | |
| 67 | 1SJ17IS082 | 10 | 10 | 10 | 9 | 9 | 10 | 10 | | | |
| 68 | 1SJ17IS083 | 10 | 9 | 10 | 10 | 9 | 10 | 10 | | | |
| 69 | 1SJ17IS084 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | | |
| 70 | 1SJ17IS085 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | | |

SJCT/NBA/
CIE MARKS/
2020 21



SJCT INSTITUTE OF TECHNOLOGY

Chikkballapur - 562 101

Department of Information Science & Engineering

Course Title:

Internet of Things Technology

Subject Code:

17CSB1

Semester & Section

B - A & B

No.Students

76

Course Instructor Name:

Anand Tilagul & Chethan H V

Course ID:

C411

Test No:3

Ref-Question Number:

21

22

23

24

25

26

27

28

29

30

CIE Marks Entry Format For the Academic Year - 2020-21

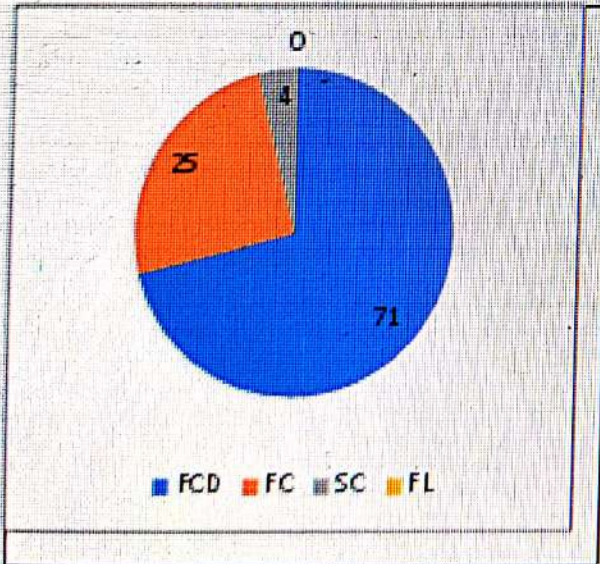
| Questions | 1,2 | 3,4 | 5,6 | 7,8 | 9,10 | 11 | 11 | | | |
|-------------------|-------------|-----|-----|-----|------|----|----|----|--|--|
| Main Question No. | 1 | 3 | 5 | 7 | 9 | 11 | 11 | | | |
| Mapped CO-No. | 4 | 4 | 4 | 5 | 5 | 5 | 6 | | | |
| Sl. | USN/Q-Marks | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |
| 36 | 1SJ17IS044 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |
| 37 | 1SJ17IS045 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | | |
| 38 | 1SJ17IS046 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | |
| 39 | 1SJ17IS049 | 10 | 0 | 10 | 10 | 9 | 10 | 10 | | |
| 40 | 1SJ17IS050 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | |
| 41 | 1SJ17IS051 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | |
| 42 | 1SJ17IS052 | 10 | 10 | 9 | 10 | 9 | 10 | 10 | | |
| 43 | 1SJ17IS054 | 10 | 9 | 10 | 9 | 9 | 10 | 10 | | |
| 44 | 1SJ17IS055 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | |
| 45 | 1SJ17IS056 | 10 | 10 | 9 | 9 | 10 | 10 | 10 | | |
| 46 | 1SJ17IS057 | 9 | 0 | 10 | 10 | 10 | 10 | 10 | | |
| 47 | 1SJ17IS059 | 9 | 10 | | 19 | 9 | 10 | 10 | | |
| 48 | 1SJ17IS061 | 10 | 9 | 9 | 10 | 10 | 10 | 10 | | |
| 49 | 1SJ17IS062 | 10 | 10 | 9 | | 10 | 10 | 10 | | |
| 50 | 1SJ17IS063 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | |
| 51 | 1SJ17IS064 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | |
| 52 | 1SJ17IS065 | 10 | 9 | 10 | 10 | | 10 | 10 | | |
| 53 | 1SJ17IS066 | 10 | 9 | 9 | 9 | 9 | 10 | 10 | | |
| 54 | 1SJ17IS067 | 10 | 9 | 9 | 10 | 10 | 10 | 10 | | |
| 55 | 1SJ17IS068 | 10 | 10 | 9 | 10 | 9 | 10 | 10 | | |
| 56 | 1SJ17IS069 | 10 | 9 | 9 | 9 | | 10 | 10 | | |
| 57 | 1SJ17IS070 | 10 | 9 | 10 | 10 | 9 | 10 | 10 | | |
| 58 | 1SJ17IS072 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | | |
| 59 | 1SJ17IS073 | 10 | 9 | 10 | 9 | 9 | 10 | 10 | | |
| 60 | 1SJ17IS074 | 10 | 9 | 9 | 9 | 10 | 10 | 10 | | |
| 61 | 1SJ17IS076 | 0 | 10 | 10 | 10 | 9 | 10 | 10 | | |
| 62 | 1SJ17IS077 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | |
| 63 | 1SJ17IS078 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | |
| 64 | 1SJ17IS079 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | | |
| 65 | 1SJ17IS080 | 10 | 9 | 10 | 10 | 10 | 10 | 10 | | |
| 66 | 1SJ17IS081 | 10 | 10 | 10 | 9 | 10 | 10 | 10 | | |
| 67 | 1SJ17IS082 | 10 | 10 | 10 | 9 | 9 | 10 | 10 | | |
| 68 | 1SJ17IS083 | 10 | 9 | 10 | 10 | 9 | 10 | 10 | | |
| 69 | 1SJ17IS084 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | | |
| 70 | 1SJ17IS085 | 10 | 9 | 9 | 10 | 9 | 10 | 10 | | |

SJCT/NBA/
SEE REPT/
2020-21



S J C INSTITUTE OF TECHNOLOGY
Chickballapur - 562 101
Department of Information Science & Engineering

| | | | | | | | |
|--|-------------------------------|----------|---|---------|-------------|--------|------|
| Course Title | Internet of Things Technology | | | | Course Code | C411 | |
| Subject Code | 17CS81 | Semester | B | Section | A & B | Emp.ID | 2095 |
| Faculty Name | Anand Tilagul & Chethan H V | | | | No.students | 76 | |
| Result Analysis of Subject Code -17CS81 - for the Academic year 2020-21 | | | | | | | |



| Result Analysis of Section: B - A & B | | | | |
|---------------------------------------|------|-----|------|---|
| No. Students | Pass | % | Fail | % |
| 76 | 76 | 100 | | 0 |

| Class Analysis of Section: B - A & B | | | |
|--------------------------------------|----|----|-------------|
| No. Students | 76 | % | Grade Point |
| FCD | 54 | 71 | 10,9,8 |
| FC | 19 | 25 | 7 |
| SC | 3 | 4 | 6,4 |
| FL | | 0 | 0 |

| Max. and Avg. Marks | | | | | |
|---------------------|-----|-----|-----|-----|-----|
| CIE | AVG | SEE | AVG | TOT | AVG |
| 40 | 39 | 60 | 35 | 100 | 74 |

| CO Attainment in SEE | |
|----------------------|-----|
| Sum_AT | 168 |
| T_students | 76 |
| Avg.ATNT | 2.2 |
| Sum_AT(=3) | 39 |
| AT(=3)% | 51 |
| Attainment | NO |

| ANALYSIS OF GRADE POINT AND GRADE LETTER | | | | | | | |
|--|----|----|----|----|---|---|---|
| Grade Letter | S | A | B | C | D | E | F |
| Grade Point | 10 | 9 | 8 | 7 | 6 | 4 | 0 |
| No. of Students | 1 | 15 | 38 | 19 | 3 | | |
| % of Students | 1 | 20 | 50 | 25 | 4 | | |

| | |
|-------------------------------------|------|
| CIE and SEE correlation Coefficient | 0.36 |
|-------------------------------------|------|