**Government of Karnataka**

**Department of Collegiate and Technical Education**

**Board of Technical Examinations, Bangalore**

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|---|---|---|---|
| **Course Code** | 20CS01P | **Semester** | I/II |
| **Course Title** | **IT SKILLS** | **Course Group** | ES/CS |
| **No. of Credits** | 4 | **Type of Course** | Lecture + Practice |
| **Course Category** | ES | **Total Contact Hours** | 6Hrs Per Week<br>78Hrs Per Semester |
| **Prerequisites** | Basic Computer Skills | **Teaching Scheme** | (L:T:P)= 1:0:2 |
| **CIE Marks** | 60 | **SEE Marks** | 40 |

## 1. RATIONALE

Information Technology is crucial to the majority of the business and has a great influence on innovation and engineering. Every branch of engineering and every organization opt for computers and IT skills for business automation, communication/connectivity, resource planning, work automation and securing information etc. All engineering diploma students must be conversant with the basic IT skills which empower them to learn new technologies, adapt to changes, business development, communication etc.

## 2. COURSE SKILL SET

The aim of the course is to help the student to attain the following industry identified competency through various teaching –learning experiences.

Perform jobs related to web design and maintenance, business process automation tool management, cyber security and safety and program assistant.

## 3. COURSE OBJECTIVES

5) Demonstrate the basics of coding.
6) Design and develop web pages that include static and dynamic content.
7) Describe the basic concepts of Cloud and IoT.
8) Express the workflow and business automation
9) Recognize the best practices of Cyber Safety and security.

## 4. JOB ROLE

| SL.NO | LEVEL | JOB ROLES |
|---|---|---|
| 1 | 3 | Junior software developer - web. |
| 2 | 3 | Junior Creative Designer/Digital Artist |

## 5. PREREQUISITES

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| STUDENT | Basic Computer skills (Students without basic computer skills should be taught basic skills) |
| TEACHER | Computer science faculty with required knowledge of IT Skills. |

## 6. COURSE OUT COMES

On successful completion of the course, the students will be able to demonstrate industry oriented Cos associated with the above mentioned competency:

| COURSE OUTCOME | | UNIT LINKED | CL | LINKED PO | TEACHING HOURS |
|---|---|---|---|---|---|
| CO1 | Illustrate the basics of coding and develop simple applications for android phones. | 1 | U, A | 1,4,7 | 15 |
| CO2 | Design and Develop websites. | 2 | U, A | 1,4,7 | 30 |
| CO3 | Identify Cloud Services IoT applications | 3 | U | 1,4,7 | 12 |
| CO4 | Apply workflow and use ERP for a simple project plan | 4 | U | 1,4,7 | 09 |
| CO5 | Implement best practices of cyber safety and security in the workplace. | 5 | U, A | 1,4,7 | 12 |
| | **TOTAL** | | | | **78** |

**Legends: R = Remember; U = Understand; A = Apply and above levels CL = Cognitive Level (Bloom's revised taxonomy)**

## 8. INSTRUCTIONAL STRATERGY

**These are sample strategies, which teacher can use to accelerate the attainment of the various course outcomes**

1) Lecturer method(L) does not mean only traditional lecture method, but different type of teaching method and media visual/graphical content that are employed to develop the outcomes
2) Massive Open on-line courses (MOOCS) can be used to teach various topics/sub topics.
3) Online coding platform wherever mentioned.
4) Hands on coding should be practiced.
5) About 15 to 20% of the topics/sub topics which are relatively simpler or descriptive in nature is to be given to the students for self-directed learning

## 9. DETAILS OF COURSE CONTENT

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

| UNIT NO | Topics/Sub topics | Unit skill set/Learning outcomes (In cognitive domain) | Hours L-T-P |
|---|---|---|---|
| 1 | **UNIT 1 - INTRODUCTION TO BASICS OF CODING** | | 05-0-10 |
| | a) Introduction to computer programming<br>b) Algorithms –With sufficient examples<br>c) Flowcharts – With sufficient examples<br>d) Execute simple programs<br>**Note: Below listed or any other suitable online/offline coding platforms should be used to demonstrate and provide coding experience to students.**<br>**a. https://scratch.mit.edu/** | 1. Understand computer programming<br>2. Create and write Algorithm for programmable problems.<br>3. Design Flowchart for programmable problems.<br>4. Develop simple Android application. | |

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| | **b. https://studio.code.org/projects**<br><br>Suggested programs are listed in Table 1<br>e) Introduction to Application development<br>f) Simple android application development (No knowledge of programming language is required).<br>**Note:**<br>***i. The purpose of application development is to ignite and promote programming skills.***<br>***ii. Application development should be done using any App builder platforms such as***<br>***iii. MITApp Inventor: https://appinventor.mit.edu/***<br>***iv. Thunkable: https://thunkable.com/***<br>***v. ibuildapp: https://ibuildapp.com/***<br>***vi. The student should be introduced to the android application development environment for further research and learninghttps://developer.android.com/***<br>g) Activity: create a simple Android application (Unique for each student) publish on the learning management system. | | |
| 2 | **UNIT 2 - DESIGN AND DEVELOP WEB PAGES** | | 10-0-20 |
| 2 | a) Basic web technologies<br>▪ Browser<br>▪ Web –Server<br>▪ Client-Server Model<br>▪ URL<br>▪ SEO techniques<br>▪ Domain names and domain name system.<br>b) Creating Web-pages with HTML5 - Static | 1. Understand and examine basic web technologies<br>2. Creating static web pages<br>3. Formatting Webpages with cascading style sheets (CSS)<br>4. Creating Dynamic web pages with JavaScript | |

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| | web pages.<br>▪ Introduction, Editors<br>▪ Tags, Attributes, Elements, Headings<br>▪ Links, Images, List, Tables, Forms<br>▪ Formatting, Layout, Iframes.<br>2.3 Formatting web pages with style sheets (CSS3).<br>▪ Introduction to CSS<br>▪ Inline CSS, Internal CSS, Classes and IDs<br>▪ div, Color, Floating, Positioning<br>▪ Margins, Padding, Borders<br>▪ Fonts, Aligning Text, Styling Links<br>2.4 Creating a web page dynamic using JavaScript.<br>▪ Dynamic web page and Introduction to JS<br>▪ Basic syntax<br>▪ Functions<br>▪ Events<br>Note: Refer https://www.w3schools.com<br>**2.6** Creating dashboards in websites.<br>**2.6 Activity: Personal website design and launch with a free platform or Create a Blogging website.**<br>▪ **Online platforms (Learning and executing)**<br>▪ **https://www.w3schools.com/**<br>▪ **https://studio.code.org**<br>▪ **https://www.khanacademy.org**<br>**Note:**<br>**1) The student must be introduced to website development platforms - worldpress.com.**<br>**2) The student must be made familiar** | 5. Creating and launching dashboard based personal website. | |

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| | **with launching websites .**<br>Certification available:<br>• HTML - W3schools<br>• CSS - W3schools<br>• JavaScript - W3schools | | |
| 3 | **UNIT 3 -BUSINESS PROCESS AUTOMATION/ERP** | | 03:0:06 |
| 3 | 6.2 Introduction to business process automation.<br>6.3 Organization structure and functions composition-Properties and applications<br>▪ Structure<br>▪ Types<br>▪ Functional Units<br>**Note: Students should be made familiar with organization, types and components of a big enterprise to make him understand the working of organization keeping him as part of org.**<br>6.4 Workflows<br>▪ Introduction<br>▪ Components<br>▪ Use and use cases<br>**Note: Use free and open-source platform to demonstrate and create workflows.**<br>**Example:**<br>**https://airflow.apache.org/**<br>**https://taverna.incubator.apache.org/**<br>**https://trello.com/**<br>**https://www.processmaker.com/**<br>6.5 Enterprise resource planning<br>▪ History<br>▪ Evolution<br>▪ Uses of ERP<br>▪ ERP software tools. | 1. Identify and examine the needs of business process automation.<br>2. Understand Organization structure and functions<br>3. Create and use workflows<br>4. Use Enterprise resource planning in workplace. | |

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| | **Note: The student should be introduced into Enterprise resource planning software tools to understand importance of ERP.**<br>**Examples:**<br>▪**https://erpnext.com/**<br>▪**www.bitrix24.com**<br>▪**https://www.odoo.com/**<br>**3.5 Activity:**<br>▪ **Project plan for summer internship - use open source ERP Software**<br>▪ **Identify different components of nearby organization with recourse plan and workflow design.**<br>▪ **Identify types of ERP software available with their market share.** | | |
| 4 | **UNIT 4 - INTRODUCTION TO CLOUD AND IOT CONCEPTS** | | 04-0-8 |
| | 4.1 Fundamentals of cloud<br>4.2 Cloud service models<br>▪ IaaS (Infrastructure-as-a-Service)<br>▪ PaaS (Platform-as-a-Service)<br>▪ SaaS (Software-as-a-Service)<br>4.3 Cloud deployment types<br>▪ Public,<br>▪ Private,<br>▪ Hybrid<br>▪ Community Cloud<br>4.4 Cloud services:<br>▪ Google Drive - file storage and synchronization service developed by Google;<br>▪ Google docs- bring your documents to life with smart editing and styling tools to help you easily format text and paragraphs;<br>▪ Google Co-lab (Usage of Jupyter Notebook): *Colab* notebooks allow you to combine | 1. Understand Cloud concepts<br>2. Identify and use Cloud services<br>3. UnderstandIoT concepts<br>4. Identify IoT applications | |

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| | executable code and rich text in a single document, along with images, HTML, LaTeX, and more.<br>▪ Google App Engine: Google App Engine is a Platform as a Service and cloud computing platform for developing and hosting web applications in Google-managed data centers. Applications are sandboxed and run across multiple servers.<br><br>**Note: Above cloud services are not compulsory for all branches; teacher can recommend other cloud service based on need of engineering branch.**<br><br>4.5 Working of IoT and IoT components (Only brief introduction and demonstration through videos)<br>4.6 Explain concept of Internet of Things with examples<br>▪ Smart home<br>▪ Smart city<br>▪ Smart farming<br>**Note:**<br>**a. Teacher can also select specific area of work where Things (autonomous computing devices) could be interconnected over TCP/IP to establish IoT.**<br>b. **The students should be introduced to the IoT environment for further research and study**.<br>**Example:**<br>▪ **https://www.raspberrypi.org/**<br>▪ **https://www.arduino.cc/** | | |

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| | **4.7 Activity:**<br>**Create your cloud service account and demonstrate using cloud services.**<br>**Identify cloud service provider with respect to service models and deployment types.**<br>**Identify areas where Internet of Things could bring positive changes.** | | |
| **5** | **UNIT 5 - CYBERSECURITY AND SAFETY** | | **4-0-8** |
| | 5.1 Introduction to Cyber security and cyber safety.<br>▪ Brief awareness on cyber safety measures<br>▪ Identification of basic security issues in mobile phones and personal computers<br>▪ Installation of Antivirus software<br>▪ Firewall concepts<br>▪ Browser settings<br>▪ Importance of privacy and Password policy (Best practices).<br>5.2 Common threats - Demonstration<br>▪ Phishing<br>▪ DoS attack<br>▪ Man in the middle attack<br>▪ Eavesdropping<br>▪ Spamming<br>**5.3 Activity**<br>▪ **Identification of basic security issues in computers of your college and fixing the same.**<br>▪ **Visit nearby government organization.**<br>▪ **Identify basic cybersecurity issues and fixing the same**<br>▪ **Demonstrate the importance of cybersecurity, password policy, and cyber safety.** | 1. Identify need for Cyber security and cyber safety<br>2. Identify basic security issues in mobile phones and personal computers<br>3. Examine Importance of privacy, Password policy<br>4. Implement best practices of cyber safety and security in work place | |

## 10. SUGGESTED PRACTICAL SKILL EXERCISES

**TABLE-I**

| Sl. No. | Practical Out Comes/Practical exercises | Unit No. | PO | CO |
|---|---|---|---|---|
| 1 | Write an algorithm for programmable problems<br>Example for Reference:<br>• Add/subtract two numbers<br>• Find the largest/smallest of 3 numbers<br>• Calculate and print sum of 'N' numbers | 1 | 1,4,7 | 1 |
| 2 | Design a flowchart for programmable problems<br>Example for Reference:<br>Add/subtract two numbers<br>Find the largest/smallest of 3 numbers<br>Calculate and print sum of 'N' numbers | 1 | 1,4,7 | 1 |
| 3 | Design and create simple game using MIT-scratch/Code.org | 1 | 1,4,7 | 1 |
| 4 | Design and create simple android application (MIT App Inventor) | 1 | 1,4,7 | 1 |
| 5 | Design and create webpage for displaying your poem (Title, header, paragraph, formatting tags) | 2 | 1,4,7 | 2 |
| 6 | Design and create webpage for your wish list (What you want to do). Also list challenges and opportunities along with images to present your dreams (List ordered and unordered, Image, table) | 2 | 1,4,7 | 2 |
| 7 | Design and create webpage using HTML and CSS about an awesome animal (Use necessary CSS tags) | 2 | 1,4,7 | 2 |
| 8 | Design and create web page for a travel book/recipe book with more than 3 pages, table to list places/recipes (iframe, hyperlink) | 2 | 1,47 | 2 |
| 9 | Design and create web page with JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient | 2 | 1,4,7 | 2 |
| 10 | Design and create a personal webpage with dashboard | 2 | 1,4,7 | 2 |
| 11 | Design and create web page about advantages of business process automation with respect to your branch of engineering | 2,3 | 1,4,7 | 2,3 |

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|---|---|---|---|---|
| 12 | Create a workflow for education loan approval in bank/diploma admission process (Use any tool) | 3 | 1,4,7 | 3 |
| 13 | Demonstrate ERP with ERPNext Demo for manufacturing, retail and service sector (Use any other ERP tools) | 3 | 1,4,7 | 3 |
| 14 | Create user account and demonstrate use of Google drive, Google docs, Google Co-lab (Usage of Jupyter Notebook) | 4 | 1,4,7 | 4 |
| 15 | 5.1 Demonstrate Internet of Things using with examples<br>a. Smart home<br>b. Smart city<br>c. Smart farming<br>Note: Teacher can also select specific area of work where Things (autonomous computing devices) could be interconnected over TCP/IP to establish IoT. | 4 | 1,4,7 | 4 |
| 16 | Installation of Antivirus software | 5 | 1,4,7 | 5 |
| 17 | Demonstration and hands on browser settings | 5 | 1,4,7 | 5 |
| 18 | Demonstration and hands on privacy settings and password policy | 5 | 1,4,7 | 5 |
| 19 | Demonstration of common security threats (using videos)<br>6. Phishing<br>7. DoS attack<br>8. Man in the middle attack<br>9. Spamming<br>10. Virus | 5 | 1,4,7 | 5 |

The suggested practical activities (TABLE-I) in this section are demonstrated for the attainment of the competency. These practical activities can also be used for the student assessment in portfolio mode for awarding CIE marks. **The lecturer can enhance the competency level of the students by sketching more practical exercises.**

**NOTES:**

1. It is compulsory to prepare log book/record of exercises. It is also required to get each exercise recorded in logbook, checked and duly dated signed by the teacher
2. Student activities are compulsory and are also required to be performed and noted in logbook.
3. Student activity is compulsory and part of skill assessment. The activity enable student to explore the course, help student to demonstrate creativity & critical thinking.
4. Student activity report is compulsory part to be submitted at the time of practical ESE
5. Term work report is compulsory part to be submitted at the time of practical ESE.

6. Student activity and student activity reports must be uploaded to Learning management system.
7. For CIE, students are to be assessed for Skills/competencies achieved.

## 11. MAPPING OF CO WITH PO

| COURSE | CO'S | PROGRAMME OUTCOMES (PO'S) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| IT SKILLS | CO1 | 3 | 0 | 0 | 3 | 0 | 0 | 3 |
| | CO2 | 3 | 0 | 0 | 3 | 0 | 0 | 3 |
| | CO3 | 3 | 0 | 0 | 3 | 0 | 0 | 0 |
| | CO4 | 3 | 0 | 0 | 3 | 0 | 0 | 3 |
| | CO5 | 3 | 0 | 0 | 3 | 0 | 0 | 0 |
| **Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped** | | | | | | | | |

## 12 SUGGESTED LEARNING RESOURCES

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|---|---|
| | **BOOKS** |
| **1** | The Art of Programming Through Flowcharts & Algorithms, A. B. Chaudhuri, Firewall Media publication |
| **2** | HTML5 Black Book, by Publishing company Limited. Kogent Learning Solutions Inc. |
| **3** | "World Wide Web design with HTML", Xavier, Tata McGraw-Hill |
| **4** | Internet of Things – A Hands on Approach, By ArshdeepBahga and Vijay Madisetti Universities Press, ISBN: 9788173719547 |
| | **URL'S** |
| **1** | https://scratch.mit.edu |
| **2** | https://studio.code.org |
| **3** | http://ai2.appinventor.mit.edu |
| **4** | https://www.w3schools.com |
| **5** | https://www.tutorialspoint.com/javascript/index.htm |
| **6** | https://www.geeksforgeeks.org/html-tutorials/ |
| **7** | Android<br>https://developer.android.com |
| **8** | https://www.khanacademy.org |
| **9** | Tools for Web Development<br>a. https://www.wix.com |

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| | b. https://atom.io/<br>c. https://www.openelement.com/<br>d. https://www.layoutit.com |

## 13. SUGGESTED LIST OF PROPOSED STUDENTS ACTIVITY

**Note:** Refer activities mentioned in DETAILS OF COURSE CONTENT table

## 14. COURSE ASSESSMENT AND EVALUATION CHART

| SL.NO | ASSESSMENT | DURATION (in minutes) | MAX MARKS | CONVERSION |
|---|---|---|---|---|
| **1** | CIE Assessment 1 ( Written Test -1 TH) - At the end of 3rd week | **60** | **20** | Average of two written tests 20 |
| **2** | CIE Assessment 2 (Written Test -2 TH) - At the end of 13th week | **60** | **20** | |
| **3** | CIE Assessment 3 (Skill Test) - At the end of 5th week | **3 hrs** | **20** | Average of three skill test 20 |
| **4** | CIE Assessment 4 (Skill Test) - At the end of 7th week | **3 hrs** | **20** | |
| **5** | CIE Assessment 5 (Skill Test) - At the end of 9th week | **3 hrs** | **20** | |
| **6** | CIE Assessment 6 (Student activity)- At the end of 11th week | **-** | **20** | **20** |
| **7** | **Total Continuous Internal Evaluation (CIE) Assessment** | | | **60** |
| **8** | Semester End Examination(SEE) Assessment (Practical Test) | **3 hrs** | **100** | **40** |
| **TOAL MARKS** | | | | **100** |
| Note: CIE written test is conducted for 20 marks (Two sections). Each section shall have two full questions of same CL, CO. Student shall answer one full question from each section. | | | | |

## 15. RUBRICS FOR ACTIVITY

| RUBRICS FOR ACTIVITY (Example Only)<br>Appropriate rubrics shall be developed by the concerned faculty | | | | | | |
|---|---|---|---|---|---|---|
| **Dimension** | **Poor** | **Below Average** | **Average** | **Good** | **Exemplary** | **Student Score** |
| | **4** | **8** | **12** | **16** | **20** | |
| **Concept** | Does not collect any information relating to the concept | Collects very limited information; some relate to the concept | Collect much information; but very limited relate to the concept | Collects some basic information; most refer to the concept | Collects a great deal of information; all refer to the concept | 8 |
| **Design** | Design is not acceptable/very poorly structured | Design is poor and not well structured. | Design Fallowed layout samples and well structured | Design & convey both content and context | Design considered all aspect of concept, concept and presentation (UI) | 6 |
| **Creativity** | Very little creativity in design/implementation | Creativity in concept or design or implementation | Creativity in concept /design/implementation | Creativity in concept /design/implementation which complements each other | Creative concept, content, presentation and implementation | 8 |
| **Implementation** | Poorly implemented | Partially implemented | Implemented on time with results (content) | Product convey both content and context | Product is creative with easy-to-use UI, structure | 8 |
| **Average / Total Marks: (8+6+8+8)/4** | | | | | | **7.5 = 8** |

## 16. RUBRICS for Skill Test Evaluation (Both for CIE & SEE)

| Sl No | Parameter to be Observed | Marks Allotted |
|---|---|---|
| 1 | Design-Written<br>Skill Test 1: Algorithm / Flowchart/Visual Design<br>Skill Test 2: Web site visual design<br>Skill Test 3: Work flow or Project plan or cyber security plan or Cloud service Concept | 30 |
| 2 | Implementation<br>Skill Test 1: Android application<br>Skill Test 2: Web site / Web pages<br>Skill Test 3: Create or use cloud service account or Cyber safety and security- Antivirus Installation or browser settings | 50 |
| 3 | Appeal and Presentation | 20 |
| **Total** | | **100** |

## 17. SYSTEM REQUIREMENTS:

| Sl. No. | Specification | Quantity |
|---|---|---|
| 1. | Computers with HD Graphics Card | 20 |
| 2. | Software: GIMP, KRETA, BLENDER, PHOTOSHOP or any other relevant open-source software. | - |
| 3. | Internet Connectivity | - |

**Note: Above specification is for a batch of 20 students**