



NEP-2020

CURRICULUM STRUCTURE AND SYLLABUS OF
SKILL ENHANCEMENT COURSE (SEC) FOR ALL UG PROGRAMMES
(EXCEPT BCA PROGRAMME)

UG BOS IN COMPUTER SCIENCE

w.e.f Academic Year 2022-23 onwards

SEC FOR FIRST/SECOND SEMESTER

Syllabus for Digital Fluency

The Institution can select any one model among the below two models

Digital Fluency - Model 1

Course Title: Digital Fluency	Course Credits: 2
Total Contact Hours: 15 hours + 30 hours practical demonstration in classroom	Duration of Exam: 01 hour
Formative Assessment Marks: 40 marks	Summative Assessment Marks: 60 marks

Course Content: In concurrence with Digital Fluency 101 on NASSCOM 101 environment

Sl.no	Content	Details of topic	Duration
1.	Registration	Future Skills Course Registration Process	
2.	Module 1: Emerging Technologies	Overview of Emerging Technologies: i. Artificial Intelligence, Machine Learning, Deep Learning, ii. Database Management for Data Science, Big Data Analytics, iii. Internet of Things (IoT) and Industrial Internet of Things (IIoT) iv. Cloud computing and its service models v. Cyber Security and Types of cyber attack	05 Theory hours and 10 practical hours
3.	Module 2: Applications of Emerging Technologies	Applications of emerging technologies: i. Artificial Intelligence ii. Big Data Analytics iii. Internet of Things iv. Cloud Computing v. Cyber Security	05 Theory hours and 10 practical hours
4.	Module 3: Building Essential Skills Beyond Technology	Importance of the following: i. Effective Communication Skills ii. Creative Problem Solving & Critical Thinking iii. Collaboration and Teamwork Skills iv. Innovation & Design Thinking v. Use of tools in enhancing skills	05 Theory hours and 10 practical hours

References to learning resources:

1. The learning resources made available for the course titled “Digital 101” on Future Skills Prime Platform of NASSCOM

Pedagogy

1. Flipped classroom pedagogy is recommended for the delivery of this course. For every class:
2. Before coming to the class students are expected to go through the content (both video and other resources) on the related topic and give the quiz on Future Skills Prime Platform of NASSCOM.
3. Class room activities are designed around the topic of the session towards developing better understanding, clearing misconceptions and discussions of higher order thinking skills like application, analysis, evaluation and design.
4. Every theory class ends with announcement of exercise for practical activity of the week

Assessment

Formative Assessment	
Assessment Occasion	Weightage in Marks
1. After watching videos of each topic, 05 marks tests are to be given by the students on Future Skills Prime Platform. The total marks earned by students is to be computed.	No weightage
2. Formative Assessment (Internal Assessment): All activities and Practical sessions from Module 1, Module 2 and Module 3 need be completed by students. All the activities are expected to be done in teams with each team comprising of 02 -03 students. Each of Module 1 and Module 2 carry 15 marks weightage and Module 3 carries 10 marks weightage.	40%
Summative Assessment	
University will conduct examination which carries 60 marks weightage.	60%
In addition, after completion of all 3 modules students will be giving final assessment with 30 questions (30 min) on Digital course on Future Skills Prime platform. Students will have maximum of two attempts and those who score at least 50% marks will get certificate from NASSCOM.	

Digital Fluency- Model 2

Course Code: SEC-1	Course Title: Digital Fluency	
Course Credits: 02	Hours/Week: Theory -01 hour + 02 hours practical demonstration in classroom	
Total Contact Hours: 45 Theory -15 hours + 30 hours practical demonstration in classroom	Formative Assessment Marks: 25	
Summative Assessments Marks: 25	Exam Duration: 01 hr.	
Content		Hours
Unit - I		
Operating Systems: types of operating systems, major functions of the operating systems, types of user interface, examples of operating systems: MS-DOS, Windows, Mac OS, Linux, Solaris, Android. Office automation tools: word processor, power point, and spread sheet.		5
Unit - II		
Introduction to Computer Networks: Evolution of Networking, types of networks, Network devices - Modem, ethernet card, RJ45, Repeater, Hub, Switch, Router, and Gateways, Identification of Nodes in a Networked Communication, Internet, Web and the Internet of Things, Domain Name Systems. Security Aspects - Threats and Prevention, Malware - virus, Worms, Ransomware, Trojan, spyware, adware, key loggers, Modes of Malware distribution, Antivirus, HTTP vs HTTPS, Firewall, Cookies, Hackers and Crackers		5
Unit - III		
Database Management Systems: Relational Data Model. Introduction to e-learning platforms such as Swayam, and MOOC. Virtual Meet: Technical Requirements, Scheduling a meeting, joining virtual meet, recording the meeting, Online Forms: Creating questionnaire, Publishing Questionnaire, conducting online responses, Analysing the responses, copying graphics into PowerPoint, Downloading the response to spreadsheet. Introduction to societal impacts, Digital Foot prints, Digital Society and Netizen, Data Protection, E-waste, Impact on Health.		5
Laboratories Activities: Identifying the configuration of a computer system, laptop, and a mobile phone,		30

<p>Identifying the version and the configuration of the operating system of a computer, laptop, and a mobile phone, Identifying the network components like patch cord, switch, RJ 45 Jack, Socket, and wireless router, creating a hotspot from a mobile phone, and allowing others to use the hotspot, creating a Google form, and send it to five users, scheduling a Google meet and invite three people to join the Google meet, record the Google Meet, Creating an account in the railway reservation website, IRCTC, and finding trains from Tumkur to Hubli, creating a one minute video of your choice in your native tongue, and upload the video to YouTube.</p>	
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Web Resources:

1. Operating Systems - https://ftms.edu.my/v2/wp-content/uploads/2019/02/csc0101_ch06.pdf
2. Database Concepts - <https://ncert.nic.in/textbook/pdf/keip107.pdf>
3. Computer Networks - <https://ncert.nic.in/textbook/pdf/lcs110.pdf>
4. Security Aspects - <https://ncert.nic.in/textbook/pdf/lcs112.pdf>
5. Offences and Penalties Under IT Act 2000 - <https://taxguru.in/corporate-law/offences-penaltiesinformation-technology-act-2000.html>
6. Societal Impact - <https://ncert.nic.in/textbook/pdf/leip106.pdf>
7. Google Meet Tutorial - <https://edvance.hawaii.hawaii.edu/wp-content/uploads/Google-Meet-Tutorial-Getting-Started-and-Recording-a-Lecture.pdf>
8. Tutorial-Getting-Started-and-Recording-a-Lecture.pdf
9. Google Forms - https://pdst.ie/sites/default/files/Google%20Drive_1.pdf

SEC FOR THIRD/FOURTH SEMESTER

Syllabus for Artificial Intelligence

The Institution can select any one model among the below two models

Artificial Intelligence-Model 1

Course Code: SEC-2	Course Title: Artificial Intelligence
Course Credits: 02	Hours/Week: Theory -01 hour + 02 hours practical demonstration in classroom
Total Contact Hours: 45 Theory -15 hours + 30 hours practical demonstration in classroom	Formative Assessment Marks: 25
Summative Assessments Marks: 25	Exam Duration: 01 hr.

Course Outcomes (COs):

At the end of the course, students will be able to:

- Appraise the theory of Artificial intelligence and list the significance of AI.
- Discuss the various components that are involved in solving an AI problem.
- Illustrate the working of AI Algorithms in the given contrast.
- Analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.
- Apply the AI concepts to build an expert system to solve the real-world problems.

Course Content

Unit - 1	
Overview of AI: Definition of Artificial Intelligence, Philosophy of AI, Goals of AI, Elements of AI system, Programming a computer without and with AI, AI Techniques, History of AI. Intelligent Systems: Definition and understanding of Intelligence, Types of Intelligence, Human Intelligence vs Machine Intelligence.	05
Unit – 2	
AI Applications: Virtual assistance, Travel and Navigation, Education and Healthcare, Optical character recognition, E-commerce and mobile payment systems, Image based search and photo editing. AI Examples in daily life: Installation of AI apps and instructions to use AI apps.	05
Unit – 3	
Robotics: Introduction to Robotics, Difference in Robot System and Other AI Program, Components of a Robot.	05

Laboratory Activities:

- **Amazon Alexa:**
<https://play.google.com/store/apps/details?id=com.amazon.dee.app&hl=en&am p:gl=US>
- **Google Lens:**
<https://play.google.com/store/search?q=google+lens&c=apps&hl=en&gl=US>
- **Image to Text to Speech ML OCR:**
https://play.google.com/store/apps/details?id=com.mlscanner.image.text.speech&hl=en_IN&gl=US
- **Google Pay:**
https://play.google.com/store/apps/details?id=com.google.android.apps.nbu.paisa.user&hl=en_IN&gl=US
- ⑦ Grammarly:
https://play.google.com/store/search?q=grammarly&c=apps&hl=en_IN&gl=US
- ⑦ Google Map:
<https://play.google.com/store/search?q=google+maps&c=apps&hl=en&gl=US>
- ⑦ FaceApp:
https://play.google.com/store/apps/details?id=io.faceapp&hl=en_IN&gl=US
- ⑦ Socratic:
https://play.google.com/store/apps/details?id=com.google.socratic&hl=en_IN&gl=US
- ⑦ Google Fit: Activity Tracking:
https://play.google.com/store/apps/details?id=com.google.android.apps.fitness&hl=en_IN&gl=US
- ⑦ SwiftKey Keyboard:
<https://swiftkey-keyboard.en.uptodown.com/android>
- ⑦ E-commerce App:
https://play.google.com/store/apps/details?id=com.jpl.jiomart&hl=en_IN&gl=US

30

Text Books:

1. Wolfgang Ertel, "Introduction to Artificial Intelligence", 2nd Edition, Springer International Publishing 2017.
2. Michael Negnevitsky, "Artificial Intelligence A Guide to Intelligent Systems", 2nd Edition, Pearson Education Limited 2005.

References:

1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_tutorial.pdf
2. Kevin Knight, Elaine Rich, Shivashankar B. Nair, "Artificial Intelligence", 3rd Edition, July 2017.

Reference Links:

1. Voice Assistant: <https://alan.app/blog/voiceassistant-2/>
2. Browse with image: <https://www.pocket-lint.com/apps/news/google/141075-what-is-google-lens-and-how-does-it-work-and-which-devices-have-it>
3. OCR: <https://aws.amazon.com/what-is/ocr/>
4. Mobile Payment system: <https://gocardless.com/en-us/guides/posts/how-do-mobile-payment-systems-work/>
5. Grammarly: <https://techjury.net/blog/how-to-use-grammarly/#gref>
6. Travel & Navigation: <https://blog.google/products/maps/google-maps-101-ai-power-new-features-io-2021/>
7. AI in photo editing: <https://digital-photography-school.com/artificial-intelligence-changed-photo-editing/>
8. AI in education: <https://www.makeuseof.com/what-is-google-socratic-how-does-it-work/>
9. AI in health and fitness: <https://cubettech.com/resources/blog/implementing-machine-learning-and-ai-in-health-and-fitness/>
10. E-commerce and online shopping: <https://medium.com/@nyxonedigital/importance-of-e-commerce-and-online-shopping-and-why-to-sell-online-5a3fd8e6f416>

Artificial Intelligence-Model 2

Course Title: Artificial Intelligence	Course Credits: 2
Total Contact Hours: 15 hours of theory and 30 hours of practical demonstration in classroom	Duration of Exam: 01 Hour
Formative Assessment Marks: 25 marks	Summative Assessment Marks: 25 marks

Course Outcomes (COs):

- At the end of the course, students will be able to:
- Appraise the theory of Artificial intelligence and list the significance of AI.
- Discuss the various components that are involved in solving an AI problem.
- Illustrate the working of AI Algorithms in the given contrast.
- Analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.
- Apply the AI concepts to build an expert system to solve the real-world problems.
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Course Content (Artificial Intelligence)

	Details of topic	Duration
Course – 1 - Azure AI Fundamentals (AI-900)	AI-900 pathway consists of 5 courses and 2 reading material: Introduction to AI on Azure Use visual tools to create machine learning models with Azure Machine Learning Explore computer vision in Microsoft Azure Explore natural language processing Explore conversational AI Tune Model Hyperparameters - Azure Machine Learning (Reading) Neural Network Regression: Module Reference - Azure Machine Learning (Reading)	07 hours
Practical	Prepare the data Model the data Visualize the data Analyse the data Deploy and maintain deliverables	15 hours

Course – 2 - Data Analyst Associate (DA-100)	DA-100 pathway consists of 5 courses and 2 reading material: Get started with Microsoft data analytics Prepare data for analysis Model data in Power BI Visualize data in Power BI Data analysis in Power BI Manage workspaces and datasets in Power BI Key Influencers Visualizations Tutorial - Power BI Smart Narratives Tutorial - Power BI Microsoft Docs	08 hours
Practical	Describe Artificial Intelligence workloads and considerations Describe fundamental principles of machine learning on Azure Describe features of computer vision workloads on Azure Describe features of Natural Language Processing (NLP) workloads on Azure	15 hours

References to learning resources:

1. The learning resources made available for the course titled “Azure AI Fundamentals(AI-900) and Data Analyst Associate (DA-100).” on Future Skills Prime Platform of NASSCOM.

Pedagogy

Flipped classroom pedagogy is recommended for the delivery of this course. For every class:

1. All the faculty who takes this class should go for a Faculty Development Program on these before starting the session.
2. Faculty needs to introduce this course to the students then students need to start learning from Future Skills PRIME platform.
3. Faculty also needs to explain the course outcomes and needs of the course and why it is needed for the students.
4. Then students need to start learning online after registering on the platform.
5. Classroom activities are designed around the topic of the session towards developing better understanding, clearing doubts and discussions of high order thinking skills like application, analysis, evaluation, and design.
6. Every theory class ends with announcement of exercise for practical activity of the week.

Exercises:

Practical Exercises	Weightage in marks
After each chapter students' needs to complete exercises based on the learning in Azure environment.	No Weightage (But students need to complete it to move to next chapter) .

Assessment:

Formative Assessment	
Assessment Occasion	Weightage in Marks
1. Summative Assessment: After completion of both the courses, the student can optionally give Assessment for each of the courses on Future Skills Prime platform. Students will have two attempts and those who score at least 50% marks per course will get certificate from NASSCOM-Meity.	This assessment may be given 50% weight in computing the final grade of the students.

Who can teach this course:

1. Faculties of Dept. of Computer Science/BCA are eligible for teaching/Paper setting/evaluation of the Skill enhancement course.
2. If the Dept. of Computer Science/BCA is not existed in a college, then any faculties with qualification of M.Sc/M.Tech. (Computer Science/Information Science) OR MCA are eligible to teach.

Evaluation Method

1. The evaluation method is based on descriptive question paper, the questions shall be in both English and Kannada, the students can answer in any one medium.
2. There shall not be any explicit practical examination. However, while evaluating students for formative (continuous) assessment, the practical component shall be considered.
3. A. Formative evaluation process (Internal Assessment) - 25 Marks.

Activities	C1	C2	Total Marks
Session Test	10 Marks	-	10 Marks
Presentation /Assignment /Practical test /Project work	--	15 marks	15 marks
Total	10 Marks	15 marks	25 marks

B. summative evaluation Process (Semester End theory Examination) : 25 marks

There shall be a semester-end examination conducted by the university. This forms the third and final component of assessment(C3) and the maximum marks for the final component will be 25 marks.

Question paper pattern for Skill Enhancement Course (SEC)

Time 01 hour

Max. marks 25

Section A

1 Multiple choice questions. select the most appropriate answer from the options provided:

1x5=5

i.....

a b. c. d

ii.....

a b. c. d

iii.....

a b. c. d

iv.....

a b. c. d

v.....

a b. c. d

Section B

Answer any TWO questions from the following

2x5=10

2.

3.

4.

5

Section C

Answer any ONE questions from the following

01x10=10

6.

7.

8.