

VTU - BBA / BCA Kannada - 1,

ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage)

ಕನ್ನಡ ಕಲಿಕೆಗಾಗಿ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ - (Prescribed Textbook to Learn Kannada)

ಕನ್ನಡ - 1, ಬಳಕೆ ಕನ್ನಡ		ಸೆಮಿಸ್ಟರ್	1 ನೇ
ವಿಷಯ ಸಂಕೇತ	1BBCA101A	CIE ಅಂಕಗಳು	50
ಬೋಧನಾ ಅವಧಿ / ವಾರಕ್ಕೆ (L:T:P:S)	2:1:0:0	SEE ಅಂಕಗಳು	50
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ	25 ಗಂಟೆಗಳು	ಒಟ್ಟು ಅಂಕಗಳು	100
ಕ್ರೆಡಿಟ್ಸ್	02 Credits))	ಪರೀಕ್ಷಾ ಅವಧಿ	01 Hour
ಪರೀಕ್ಷಾ ವಿಧಾನ (SEE)	Theory (MCQ)		

Course objectives : ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

The course will enable the students,

1. To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
2. To enable learners to Listen and understand the Kannada language properly.
3. To speak, read and write Kannada language as per requirement.
4. To train the learners for correct and polite conversation.
5. To know about Karnataka state and its language, literature and General information about this state.

ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) :

These are sample Strategies, which teachers can use to accelerate the attainment of the course outcomes.

1. ಈ ಪಠ್ಯವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು.
2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು - ಅಂದರೆ ಕವಿ-ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು.
3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.

Module - 1

(05 hours of pedagogy)

1. Introduction, Necessity of learning a local language. Methods to learn the Kannada language.
2. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conversation, Listening and Speaking Activities, Key to Transcription
3. ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words

Module - 2

(05 hours of pedagogy)

1. ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns
2. ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು Qualitative, Quantitative and Colour Adjectives, Numerals
3. ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು -ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ - (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) -Predictive Forms, Locative Case

Module - 3

(05 hours of pedagogy)

1. ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು - Dative Cases, and Numerals
2. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು -Ordinal numerals and Plural markers
3. ನ್ಯೂನ/ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು & ವರ್ಣ ಗುಣವಾಚಕಗಳು -Defective/Negative Verbs & Colour Adjectives

Module- 4

(05 hours of pedagogy)

1. ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು
Permission, Commands, encouraging and Urging words (Imperative words and sentences)
2. ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು
Accusative Cases and Potential Forms used in General Communication
3. "ಇರು ಮತ್ತು ಇರಲ್ಲ" ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು -
Helping Verbs "iru and iralla", Corresponding Future and Negation Verbs
4. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ, ವಸ್ತು ಸೂಚಕ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ-
Comparative, Relationship, Identification and Negation Words

Module - 5

(05 hours of pedagogy)

1. ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು -Different types of Tense, Time and Verbs
2. ದ್, -ತ್, -ತು, -ಇತು, -ಆಗಿ, -ಅಲ್ಲ, -ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು
ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ - Formation of Past, Future and Present Tense Sentences with Verb Forms
3. Kannada Vocabulary List :ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು -Kannada Words in Conversation

Course outcome (Course Skill Set)

ಬಳಕೆ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಆಗುವ ಅನುಕೂಲಗಳು ಮತ್ತು ಫಲಿತಾಂಶಗಳು:

At the end of the course the student will be able to:

C01	To understand the necessity of learning of local language for comfortable life.
C02	To speak, read and write Kannada language as per requirement.
C03	To communicate (converse) in Kannada language in their daily life with kannada speakers.
C04	To Listen and understand the Kannada language properly.
C05	To speak in polite conversation.

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Textbook :

ಬಳಕೆ ಕನ್ನಡ

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪ್ರಸಾರಾಂಗ,

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ,

ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ :

1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಗಳಿಗಾಗಿ ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.:

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪಠ್ಯಕ್ರಮ ಸಂಯೋಜಕರು &

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VTU - BBA / BCA Kannada - 1,

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ - ಕನ್ನಡ ಬಲ್ಲ ಮತ್ತು ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗದಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

ಕನ್ನಡ - 1, ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ		ಸೆಮಿಸ್ಟರ್	1 ನೇ
ವಿಷಯ ಸಂಕೇತ	1BBCA101B	CIE ಅಂಕಗಳು	50
ಬೋಧನಾ ಅವಧಿ / ವಾರಕ್ಕೆ (L:T:P:S)	2:1:0:0	SEE ಅಂಕಗಳು	50
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ	25 ಗಂಟೆಗಳು	ಒಟ್ಟು ಅಂಕಗಳು	100
ಕ್ರೆಡಿಟ್ಸ್	02(Two) Credits	ಪರೀಕ್ಷಾ ಅವಧಿ	(Two Hours)
ಪರೀಕ್ಷಾ ವಿಧಾನ (SEE)	Theory (MCQ)		
Course objectives : ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು: The course will enable the students, 1. ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು. 2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಧಾನ ಭಾಗವಾದ ಆಧುನಿಕಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು. 3. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಮೂಡಿಸುವುದು. 4. ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯವನ್ನು ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ಪರಿಚಯಿಸುವುದು. 5. ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.			
ಬೋಧನೆ ಮತ್ತು ಕಲಿಕಾ ವ್ಯವಸ್ಥೆ (Teaching-Learning Process - General Instructions) : These are sample Strategies, which teachers can use to accelerate the attainment of the course outcomes. 1. ಈ ಪಠ್ಯವನ್ನು ಬೋಧಿಸಲು ತರಗತಿಯಲ್ಲಿ ಶಿಕ್ಷಕರು ಪ್ರಸ್ತುತ ಪುಸ್ತಕ ಆಧಾರಿಸಿ ಬ್ಲಾಕ್ ಬೋರ್ಡ್ ವಿಧಾನವನ್ನು ಅನುಸರಿಸುವುದು. ಪ್ರಮುಖ ಅಂಶಗಳ ಚಾರ್ಟ್ ಗಳನ್ನು ತಯಾರಿಸಲು ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಪ್ರೇರೇಪಿಸುವುದು ಮತ್ತು ತರಗತಿಯಲ್ಲಿ ಅವುಗಳನ್ನು ಚರ್ಚಿಸಲು ಅವಕಾಶ ಮಾಡಿಕೊಡುವುದು. 2. ಇತ್ತೀಚಿನ ತಂತ್ರಜ್ಞಾನದ ಅನುಕೂಲಗಳನ್ನು ಬಳಸಿಕೊಳ್ಳುವುದು - ಅಂದರೆ ಕವಿ-ಕಾವ್ಯ ಪರಿಚಯದಲ್ಲಿ ಕವಿಗಳ ಚಿತ್ರಣ ಮತ್ತು ಲೇಖನಗಳು ಮತ್ತು ಕಥೆ ಕಾವ್ಯಗಳ ಮೂಲ ಅಂಶಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟ ಧ್ವನಿ ಚಿತ್ರಗಳು, ಸಂಭಾಷಣೆಗಳು, ಈಗಾಗಲೇ ಇತರ ವಿಮರ್ಶಕರು ಬರೆದಿರುವ ವಿಮರ್ಶಾತ್ಮಕ ವಿಷಯಗಳನ್ನು ಟಿಪಿಟಿ, ಡಿಜಿಟಲ್ ಮಾಧ್ಯಮಗಳ ಮುಖಾಂತರ ವಿಶ್ಲೇಷಿಸುವುದು. 3. ನವೀನ ಮಾದರಿಯ ಸಾಹಿತ್ಯ ಬೋಧನೆಗೆ ಸಂಬಂಧಪಟ್ಟ ವಿಧಾನಗಳನ್ನು ಶಿಕ್ಷಕರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅನುಕೂಲವಾಗುವ ರೀತಿಯಲ್ಲಿ ಅಳವಡಿಸಿಕೊಳ್ಳಬಹುದು.			
ಘಟಕ -1 ಕನ್ನಡ ಸಂಸ್ಕೃತಿ ಮತ್ತು ಭಾಷೆ ಕುರಿತಾದ ಲೇಖನಗಳು (05 hours of pedagogy)			
1. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ - ಹಂಪ ನಾಗರಾಜಯ್ಯ 2. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ 3. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ			
ಘಟಕ - 2 ಆಧುನಿಕ ಪೂರ್ವದ ಕಾವ್ಯ ಭಾಗ		(05 hours of pedagogy)	
1. ವಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ದಕ್ಕಿ ಮಾರಯ್ಯ,			

ಜೇಡರದಾಸಿಮಯ್ಯ, ಆಯ್ದಕ್ಕಿ ಲಕ್ಕಮ್ಮ.

2. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ - ಪುರಂದರದಾಸರು
ತಲ್ಲಣಿಸಿದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೇ - ಕನಕದಾಸರು

3. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಶರೀಫ

ಘಟಕ -3 ಆಧುನಿಕ ಕಾವ್ಯಭಾಗ

(05 hours of pedagogy)

1. ಡಿವಿಜಿ ರವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದಿಂದ ಅಯ್ಯ ಕೆಲವು ಭಾಗಗಳು
2. ಕುರುಡು ಕಾಂಚಾಣ : ದಾ.ರಾ. ಬೇಂದ್ರೆ
3. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
4. ಮಬ್ಬಿನಿಂದ ಮಬ್ಬಿಗೆ : ಜಿಎಸ್ ಶಿವರುದ್ರಪ್ಪ
5. ಚೋಮನ ಮಕ್ಕಳ ಹಾಡು : ಸಿದ್ದಲಿಂಗಯ್ಯ

ಘಟಕ - 4 ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ

(05 hours of pedagogy)

1. ಡಾ. ಸರ್. ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ : ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ - ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್
2. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ

ಘಟಕ - 5 ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ (05 hours of pedagogy)

1. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
2. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

Course outcome (Course Skill Set)

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (22KSK17/27) ಪಠ್ಯ ಕಲಿಕೆಯ ನಂತರ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ :

At the end of the course the student will be able to:

C01	ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ ಮತ್ತು ಕನ್ನಡದ ಸಂಸ್ಕೃತಿಯ ಕುರಿತು ಅರಿವು ಮೂಡಿರುತ್ತದೆ.
C02	ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಆಧುನಿಕ ಪೂರ್ವ ಮತ್ತು ಆಧುನಿಕ ಕಾವ್ಯಗಳನ್ನು ಸಾಂಕೇತಿಕವಾಗಿ ಕಲಿತು ಹೆಚ್ಚಿನ ಓದಿಗೆ ಮತ್ತು ಜ್ಞಾನಕ್ಕೆ ಸ್ಪೂರ್ತಿ ಮೂಡುತ್ತದೆ.
C03	ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯ ಮತ್ತು ಸಂಸ್ಕೃತಿಯ ಬಗ್ಗೆ ಅರಿವು ಹಾಗೂ ಆಸಕ್ತಿಯನ್ನು ಹೆಚ್ಚಾಗುತ್ತದೆ.
C04	ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿಗಳ ಪರಿಚಯ ಹಾಗೂ ಅವರುಗಳ ಸಾಧಿಸಿದ ವಿಷಯಗಳನ್ನು ತಿಳಿದುಕೊಂಡು ನಾಡಿನ ಇನ್ನಿತರ ವ್ಯಕ್ತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳಲು ಕೌತುಕ ಹೆಚ್ಚಾಗುತ್ತದೆ.
C05	ಸಾಂಸ್ಕೃತಿಕ, ಜನಪದ ಹಾಗೂ ಪ್ರವಾಸ ಕಥನಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಪರೈಪುಸ್ತಕ :

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ
ಡಾ. ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ ಮತ್ತು ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ,
ಪ್ರಸಾರಾಂಗ,
ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ,
ಬೆಳಗಾವಿ.

ವಿಶೇಷ ಸೂಚನೆ :

1. ಮೇಲಿನ ಪಠ್ಯಕ್ರಮಕ್ಕೆ ಸೀಮಿತವಾಗಿ ಅಂತಿಮ ಪರೀಕ್ಷೆಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಇರುತ್ತದೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ಮತ್ತು ವಿವರಗಳಿಗಾಗಿ ಇವರನ್ನು ಸಂಪರ್ಕಿಸಿ.:

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಪಠ್ಯಕ್ರಮ ಸಂಯೋಜಕರು &

BOS Member, Humanities Board, VTU

Mobile No: 9900832331

Email ID : thimmesh83@gmail.com

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Communicative English		Semester	I
Course Code	1BBCA102	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:2:0	SEE Marks	50
Total Hours of Pedagogy	20 Hrs	Total Marks	100
Credits	2	Exam Hours	03
Course objectives: The course Communicative English (BCA107) will enable the students: 1. To know about Fundamentals of Communicative English and Communication Skills in general. 2. To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better Communication skills. 3. To impart basic English grammar and essentials of important language skills. 4. To enhance with English vocabulary and language proficiency for better communication skills. 5. To learn about Techniques of Information Transfer through presentation			
Module-1			
Introduction to Communicative English : Communicative English, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English. Interpersonal and Intrapersonal Communication Skills.			
Module-2			
Introduction to Phonetics : Phonetic Transcription, English Pronunciation, Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non silent Letters, Syllables and Structure. Word Accent, Stress Shift and Intonation, Spelling Rules and Words often Misspelt. Common Errors in Pronunciation			
Module-3			
Basic English Communicative Grammar and Vocabulary PART - I :Grammar: Basic English Grammar and Parts of Speech, Articles and Preposition. Question Tags, One Word Substitutes, Strong and Weak forms of words, Introduction to Vocabulary, All Types of Vocabulary – Exercises on it.			
Module-4			
Basic English Communicative Grammar and Vocabulary PART - II:Words formation - Prefixes and Suffixes, Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.			
Module-5			
Communication Skills for Employment :Information Transfer:Oral Presentation and its Practice. Difference between Extempore/Public Speaking, Communication Guidelines. Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue Influence. Reading and Listening Comprehensions – Exercises.			
Course outcome (Course Skill Set) At the end of the course, the student will be able to : 1. Understand and apply the Fundamentals of Communication Skills in their communication skills. 2. Identify the nuances of phonetics, intonation and enhance pronunciation skills. 3. To impart basic English grammar and essentials of language skills as per present requirement. 4. Understand and use all types of English vocabulary and language proficiency. 5. Adopt the Techniques of Information Transfer through presentation.			
Suggested Learning Resources: Text Books 1) Communication Skills by Sanjay Kumar & Pushp Lata, Oxford University Press India Pvt Ltd - 2019. 2) A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022. Reference Books: 1. Technical Communication by Gajendra Singh Chauhan and Et al, (ISBN-978-93-5350-050-4), Cengage learning India Pvt Limited [Latest Revised Edition] - 2019. 2. English for Engineers by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018. 3. English Language Communication Skills – Lab Manual cum Workbook, Cengage learning India Pvt Limited			

[Latest Revised Edition] – (ISBN-978-93-86668-45-5), 2019.

4. A Course in Technical English – D Praveen Sam, KN Shoba, Cambridge University Press – 2020.

5. Practical English Usage by Michael Swan, Oxford University Press – 2016.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions).
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts.
- ✓ Organising Group wise discussions Connecting to placement activities.
- ✓ Quizzes and Discussions, Seminars and assignment.

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COMPUTER FUNDAMENTALS			
Course Code	1BBCA103	Scheme	2026
Type of course	IPCC	Semester	I
Teaching Hours/Week (L:T:P)	3 : 0 : 2	CIE Marks	50
Total Hours of Pedagogy L:T:P:SL:TW	42 : 00 : 28 : 50	SEE Marks	50
Credits	4	Total Marks	100
Type of Examination (IPCC):	Theory- CIE +SEE, and Lab- CIE only.	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to:			
CO 1. Explain fundamental concepts of computers and number systems.			
CO 2. Describe the organization and functioning of computer hardware components.			
CO 3. Describe the role of system and application software and evaluate operating system services for efficient resource management.			
CO 4. Explain the principles of data communication and compare different networking technologies and transmission media.			
CO 5. Explain understanding of software engineering methodologies, software life cycle models, and quality assurance techniques.			
Module-1			
Introduction to Computers: Introduction, Characteristics of Computers, Generations of Computers, The Computer System.			
Data Representation: Introduction, Number System, Conversion From Decimal To Binary, Octal, Hexadecimal, Conversion Of Binary, Octal, Hexadecimal To Decimal, Conversion Of Binary To Octal, Hexadecimal, Conversion Of Octal, Hexadecimal To Binary, Binary Arithmetic, Binary Coding Schemes, Logic Gates.			
Textbook 1: Chapter 1.1, 1.3, 1.5, 1.7, 5.1-5.7, 5.10, 5.11			Number of Hours: 9
Module-2			
The Computer System Hardware: Introduction, Central Processing Unit, Memory Unit, Instruction Format, Instruction Set, Instruction Cycle, Microprocessor, Interconnecting The Units Of A Computer.			
Data Manipulation: Computer Architecture, Machine Language, Program Execution, Arithmetic/Logic Instructions, Communicating with Other Devices			
Textbook 1: Chapter 2.1-2.8, Textbook 2: Chapter 2.1-2.5			Number of Hours: 8
Module-3			
Software: Introduction, Types of software, System Software, Application Software.			
Operating System: Introduction, Objectives of Operating System, Types of OS, Functions of OS, Process Management, Memory Management, File Management, Device Management, Protection and Security.			
Textbook 1: Chapter 6.1-6.4, 7.1-7.9			Number of Hours: 09

Module-4	
Data Communications and Computer Networks: Introduction, Importance of Networking, Data Transmission Media, Data Transmission Across Media, Data Transmission and Data Networking, Computer Network, Wireless Networking. Textbook 1: Chapter 9.1-9.7 Number of Hours: 08	
Module-5	
Software Engineering: The Software Engineering Discipline, The Software Life Cycle, Software Engineering Methodologies, Modularity, Tools of the Trade, Quality Assurance, Documentation. Textbook 2: Chapter 7.1-7.7 Number of Hours: 08	
PRACTICAL COMPONENTS OF IPCC	
FIXED SET OF EXPERIMENTS Any Open-Source Office Suite (LibreOffice/OpenOffice) or Microsoft Office tools may be used to perform documentation, spreadsheet analysis, and presentation tasks associated with the laboratory experiments.	
1. Analyze the configuration of a computer system by studying processor specifications, memory organization, storage capacity, peripheral devices, and basic operating system information. Perform basic troubleshooting for common hardware and software issues, and prepare a structured technical report. 2. Develop a technical report demonstrating number system conversions, binary arithmetic, binary coding schemes, and logic gate operations by solving representative problems and presenting the solutions using suitable tables and diagrams. 3. Prepare a comparative study of computer architectures by analyzing CPU organization, memory hierarchy, instruction cycle, microprocessor features, and data manipulation processes, and present the findings using suitable block diagrams and illustrations. 4. Create a professional word processor document such as a resume, newsletter, brochure, or event circular using advanced formatting and page design. 5. Identify system software and application software installed on a computer, compare their features, perform installation, configuration, and uninstallation of suitable educational or productivity software, and prepare a comparative technical report. 6. Develop worksheets using spreadsheet software to perform data entry, cell formatting, arithmetic calculations, and implementation of basic formulas and functions such as SUM, AVERAGE, MAX, MIN, and COUNT. 7. Analyze the computer network configuration by identifying network devices,	

transmission media, IP configuration, Internet connectivity, and execute basic network diagnostic utilities (such as ping, ipconfig/ifconfig, tracert/traceroute), and prepare a network configuration report.

8. Design a mini spreadsheet application for budget calculation, attendance management, inventory tracking, or student result analysis with formulas, functions, and chart generation.
9. Prepare Software Development Life Cycle (SDLC) documentation for a simple software application including requirement analysis, flowcharts, test cases, and software quality assurance considerations.
10. Prepare and deliver a software project presentation on a simple application by illustrating the Software Development Life Cycle (SDLC), system design, testing strategy, and software quality considerations using presentation software.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. P. K. Sinha and Priti Sinha, Computer Fundamentals, 7th Edition, BPB Publications, 2022.
2. J. Glenn Brookshear, "Computer Science: An Overview", Addison-Wesley, 12th Edition, 2014.

Reference books / Manuals:

1. Ian Sommerville, Software Engineering, Pearson Education, 10th Edition, 2017.
2. Joan Lambert, Microsoft Office 2021 Step by Step, 1st Edition, Microsoft Press, 2022.
3. LibreOffice Documentation Team, LibreOffice Getting Started Guide (Version 24.x), The Document Foundation, 2024 (Open Educational Resource).
4. Microsoft Office 365: In Practice, 2019 Edition, 1st Edition ISBN10: 1260079902 | ISBN13: 9781260079906, By Randy Nordell, Kathleen Stewart, Annette Easton and Pat Graves © 2020.

Web links and Video Lectures (e-Resources):

- Computer Fundamentals 101:
https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384787485802496055267_shared/overview
- Operating Systems:
http://ndl.iitkgp.ac.in/he_document/inflibnet_epgp/inflibnet_epgp/IN_I_e_P_P_1_F_S_16151_P_1_D_F_17233_M_0_O_S_17277_17278
- Computer Networks:
http://ndl.iitkgp.ac.in/he_document/inflibnet_epgp/inflibnet_epgp/IN_I_e_P_P_1_F

_S_16151_P_1_D_F_17233_M_0_t_N_a_t_o_N_17241_17242

- Microsoft Office Tools:
http://ndl.iitkgp.ac.in/he_document/openstax_cnx/openstax/IN_O_1_W_S_a_S_1006_C_15_I_A_2537_2538
- LibreOffice Writer:
http://ndl.iitkgp.ac.in/he_document/spokentutorial/spokentutorial/IN_S_T_1_L_S_W_722_T_i_E_U_l_9_729

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Case-Based Teaching
- ICT-Enabled Teaching
- Simulation-Based Learning
- Demonstration using Digital Hardware Simulators
- Peer Learning and Group Discussions

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE Theory component will be **25 marks** and CIE Practical component will be **25 marks**.

The CIE Theory component consists of 1A tests for 25 marks. The CIE Practical component for continuous assessments will be for 15 marks through rubrics and for lab tests will be for 10 marks.

- To qualify and become eligible to appear for SEE, in the **CIE theory component**, a student must score at least **40% of 25 marks**, i.e., **10 marks**.
- To qualify and become eligible to appear for SEE, in the **CIE Practical component**, a student must secure **a minimum of 40% of 25 marks**, i.e., **10 marks**.
- To pass the **SEE**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

CIE Practical component:

The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The summation of all the experiments marks to be scaled down to 15 marks.

The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 10 marks. For laboratory test, the student is required to conduct one experiment.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include **a maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Develop and maintain a portfolio comprising professionally formatted documents, spreadsheets, presentations, and technical reports based on the laboratory experiments using a word processor, spreadsheet, and presentation software.	15
2.	Prepare and deliver a presentation on topics such as Computer Hardware, Operating Systems, Computer Networks, Software Engineering, Artificial Intelligence, or emerging digital technologies using appropriate multimedia tools.	10

Rubrics for Learning Activity (Based on the nature of learning activity, design the rubrics for each activity):

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Conceptual Understanding of Computer Systems and Software Technologies [CO1, CO2] [PO1]	Demonstrates comprehensive understanding with excellent technical accuracy and examples.	Demonstrates strong understanding with very minor gaps.	Demonstrates satisfactory understanding of concepts.	Understanding is limited and partially incorrect.	Unable to explain fundamental concepts.
Analysis of Networking, Software Engineering and AI Concepts [CO3, CO4, CO5] [PO2, PO4]	Provides insightful analysis and strong technical justification.	Provides good analysis with minor omissions.	Analysis is acceptable but lacks depth.	Limited analytical ability and weak interpretation.	No meaningful analysis attempted.
Problem Solving and Application of Concepts [CO2-CO5] [PO3, PO5]	Applies concepts effectively to solve complex scenarios and case studies.	Applies concepts correctly with minor errors.	Demonstrates basic problem-solving ability.	Application is incomplete or inaccurate.	Fails to apply concepts meaningfully.
Technical Presentation and Communication Skills [CO1-CO5] [PO9]	Presents information exceptionally well with excellent communication and confidence.	Presentation is clear and well organized.	Presentation is satisfactory with moderate clarity.	Presentation lacks structure and confidence.	Unable to communicate effectively.
Documentation and Report Preparation [CO1-CO5] [PO8, PO11]	Documentation is professional, comprehensive, and technically accurate.	Documentation is complete with minor deficiencies.	Documentation is adequate but lacks detail.	Documentation is incomplete or poorly organized.	Documentation is absent or irrelevant.

Rubrics for CIE – Continuous assessment:

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Understanding of Computer Fundamentals and Software Concepts [C01, C02] [P01]	Demonstrates comprehensive understanding of computer organization, number systems, software types, and operating system concepts with excellent technical accuracy.	Demonstrates strong understanding with minor conceptual gaps.	Demonstrates satisfactory understanding of concepts with acceptable clarity.	Shows limited understanding with several conceptual errors.	Unable to explain fundamental concepts correctly.
Analysis of Data Communication and Networking Concepts [C03] [P02, P04]	Provides detailed and insightful analysis of networking concepts, transmission media, and communication technologies with appropriate examples.	Analysis is accurate with minor omissions.	Demonstrates acceptable analytical ability with moderate clarity.	Analysis is incomplete or partially incorrect.	No meaningful analysis attempted.
Application of Software Engineering Principles [C04] [P02, P03]	Effectively applies software engineering methodologies, life cycle models, quality assurance, and documentation practices to diverse scenarios.	Applies concepts correctly with minor gaps.	Demonstrates basic application of software engineering concepts.	Application is weak and lacks proper justification.	Unable to apply software engineering concepts meaningfully.
Evaluation of Artificial Intelligence Concepts and Emerging Technologies [C05] [P01, P05]	Demonstrates excellent understanding and evaluation of AI concepts, neural networks, perception, reasoning, and robotics with relevant examples.	Demonstrates good understanding with minor inaccuracies.	Demonstrates satisfactory understanding of AI concepts.	Limited understanding of AI and emerging technology concepts.	Unable to explain AI concepts correctly.
Technical Communication, Documentation and Presentation Skills [C01-C05] [P08, P09, P011]	Documentation and presentation are exceptionally organized, technically accurate, and professionally communicated.	Documentation is complete and clearly presented.	Documentation is acceptable with moderate organization.	Documentation lacks clarity, structure, or completeness.	Documentation/presentation is absent, irrelevant, or technically incorrect.

Rubrics for SEE / CIE Test:

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Conceptual Understanding of Computer Systems and Software Technologies [CO1, CO2] [PO1]	Demonstrates comprehensive understanding with excellent technical accuracy and examples.	Demonstrates strong understanding with very minor gaps.	Demonstrates satisfactory understanding of concepts.	Understanding is limited and partially incorrect.	Unable to explain fundamental concepts.
Analysis of Networking, Software Engineering and AI Concepts [CO3, CO4, CO5] [PO2, PO4]	Provides insightful analysis and strong technical justification.	Provides good analysis with minor omissions.	Analysis is acceptable but lacks depth.	Limited analytical ability and weak interpretation.	No meaningful analysis attempted.
Problem Solving and Application of Concepts [CO2-CO5] [PO3, PO5]	Applies concepts effectively to solve complex scenarios and case studies.	Applies concepts correctly with minor errors.	Demonstrates basic problem-solving ability.	Application is incomplete or inaccurate.	Fails to apply concepts meaningfully.
Technical Presentation and Communication Skills [CO1-CO5] [PO9]	Presents information exceptionally well with excellent communication and confidence.	Presentation is clear and well organized.	Presentation is satisfactory with moderate clarity.	Presentation lacks structure and confidence.	Unable to communicate effectively.
Documentation and Report Preparation [CO1-CO5] [PO8, PO11]	Documentation is professional, comprehensive, and technically accurate.	Documentation is complete with minor deficiencies.	Documentation is adequate but lacks detail.	Documentation is incomplete or poorly organized.	Documentation is absent or irrelevant.

Suggested rubrics for Practical continuous assessment:

Performance Indicators	Excellent (4)	Very Good (3)	Good (2)	Satisfactory (1)
Understanding of Computer Hardware and Software Concepts	Demonstrates comprehensive understanding of hardware components, software installation/uninstallation, and troubleshooting procedures with accurate explanations.	Demonstrates good understanding with minor conceptual gaps.	Demonstrates basic understanding but requires guidance.	Demonstrates limited understanding of concepts and procedures.
Use of Office Productivity Tools	Effectively utilizes all relevant features of word processing, spreadsheets, and presentation tools to produce professional-quality outputs.	Uses most features correctly with minor errors or omissions.	Uses basic features adequately but lacks effective utilization of advanced features.	Uses only limited features and requires significant assistance.
Design, Formatting, and Presentation Quality	Produces highly organized, visually appealing, and professionally formatted documents, spreadsheets, and presentations.	Produces well-structured outputs with minor formatting issues.	Outputs are functional but contain noticeable formatting inconsistencies.	Outputs lack organization, consistency, and professional appearance.
Problem Solving and Application Skills	Demonstrates excellent ability to analyze requirements, apply appropriate tools, and develop effective solutions independently.	Demonstrates good problem-solving ability with minimal guidance.	Demonstrates basic application skills but requires moderate support.	Requires substantial guidance to complete assigned tasks.
Documentation and Report Preparation	Documentation is comprehensive, accurate, well-organized, and professionally presented.	Documentation is complete and clearly presented with minor omissions.	Documentation is adequate but lacks detail or organization.	Documentation is incomplete or poorly organized.
Viva-Voce and Communication Skills	Explains concepts, procedures, and outputs confidently with excellent technical clarity.	Demonstrates good understanding and answers most questions correctly.	Demonstrates basic understanding with partial responses.	Unable to adequately explain procedures or concepts.

Note: Can add Engineering & IT tool usage based on the nature of the course

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

Term Work (TW) and Self Learning (SL) components in Number of hours per semester		
Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)		
Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Develop professionally formatted documents, spreadsheets, technical reports, and presentations based on the prescribed laboratory experiments using office productivity software.	15
2.	Prepare and deliver a seminar or demonstration on topics related to Computer Fundamentals, Operating Systems, Computer Networks, or Software Engineering using multimedia presentation tools.	15
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Course Completion - Computer Fundamentals 101 https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384787485802496055267_shared/overview	20

Continuous Internal Evaluation (CIE)

(i) Theory component

The CIE marks of 25 shall be earmarked for two tests.

The first test shall be conducted after completing two modules of the syllabus and the second one after completing the rest three modules.

Each test shall be conducted for 25 marks. The average of the two tests scaled down to 25 marks shall constitute the test marks for a maximum of 25 marks.

(ii) Laboratory component

Out of 25 marks, 15 marks shall be assigned for assessment as per the rubrics listed in the course syllabus.

The remaining 10 marks shall be based on the practical test conducted by two Internal examiners appointed by the HoD. The allotment of marks shall be as per the rubrics defined for regular class work and practical test as indicated in the Table – ICs/IPCCs 1.

(i) To qualify and become eligible to appear for the SEE of the IC/IPCC, a student shall secure at least 40 % of 25 marks, i.e., 10 marks, in the CIE theory component, and at least 40 % of 25 marks, i.e., 10 marks in the CIE Practical component.

Table – ICs/IPCCs 1 Distribution of marks		
Component	Description	Marks
Allotment of marks for regular class work		
Ability in Conducting Experiments	Initiative, skill, safety practices, teamwork, and independent handling of equipment during regular lab sessions.	5 marks
Laboratory Record / Journal	Regular and neat maintenance of lab record, accuracy of results, and timely submission.	10 marks
Subtotal		15
Allotment of marks for CIE practical test		
Laboratory Test / Experiment Performance	Ability to set up apparatus, follow procedure, take observations, and obtain correct results in the test experiment.	5 marks
Viva-Voce	Understanding of theory, concepts, and experimental procedure; ability to explain results and answer related questions.	5 marks
Subtotal		10
Total		25

Passing requirement in SEE

For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.

For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.

If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

PROGRAMMING USING C			
Course Code	1BBCA104	Scheme	2026
Type of Course	PCC	Semester	I
Teaching Hours/Week (L:T:P)	3 : 0 : 0	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	42 : 0 : 0 : 48	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to: CO 1. Apply algorithms, flowcharts, and basic concepts of C programming. CO 2. Apply operators, decision-making statements, looping constructs, and jump statements. CO 3. Develop programs using arrays and string. CO 4. Develop user-defined functions to modularize the solution to the given problems. CO 5. Develop programs using structures and pointers for efficient programming and data handling.			
Module-1			
Algorithms and Flowchart: Art of Programming through Algorithms & Flowcharts. Overview of C: History of C, Importance of C, Basic Structure of C Programs, Programming Style, Compiling and Executing a 'C' Program. Constants, Variables and Data Types: Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants, Declaring a Variables as Constants and Volatile, Input / Output Statements in C. Textbook1: Chapter 1. 6, 2.1, 2.2, 2.8, 2.9, 2.10, Chapter 3.2 to 3.14, Chapter 5.1 to 5.5 Number of Hours: 9			
Module-2			
Operators: Introduction to Operators, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Precedence of Arithmetic Operators. Decision Making, Branching, Looping: Introduction, Decision Making with IF Statement, Simple IF Statement, The IF..ELSE Statement, Nesting of IF..ELSE Statements, The ELSE IF Ladder, The Switch Statement, The ?: Operator, The GOTO Statement, WHILE, DO, FOR, Jumps in LOOPS. Textbook1: Chapter 4.1 to 4.7, 4.12, Chapter 6.1 to 6.9, Chapter 7.1 to 7.5 Number of Hours: 9			
Module-3			
Arrays and Strings: Introduction, Declaration and Initialization of One-dimensional and Two-Dimensional Arrays, Declaring and Initializing String Variables, Example programs using arrays ,Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Comparison of Two Strings, String-handling Functions. Textbook1: Chapter 8.1 to 8.6, Chapter 9.2 to 9.5, 9.7, 9.8 Number of Hours: 08			
Module-4			

User-defined Functions: Introduction, Need for User-defined Functions, A Multi-functional Program, Elements of User-defined Functions, Definition of Function, Return Values and their Types, Function Calls, Function Declaration, No Arguments and no Return Values, Arguments but no Return Values, Nesting of Functions.

Textbook1: Chapter 10.1 to 10.8, 10.10 to 10.14

Number of Hours: 08

Module-5

Structures and Pointers: Introduction, Defining a Structure, Declaring and Accessing Structure Variables and Members, Structure Initialization, Copying and Comparing Structure Variables, Array of Structures, Arrays within Structures.

Pointers: Introduction, Understanding Pointers, Accessing the Address of Variable, Declaring pointer variables, initialization of pointers, accessing variables through its pointer.

Textbook1: Chapter 11.1 to 11.6, 11.8, 11.19, Chapter 12.1 to 12.6

Number of Hours: 08

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. E Balaguruswamy, Programming in ANSI C, 9e, , Tata McGraw Hill Education, 2024.

Reference books / Manuals:

1. Reema Thareja, PROGRAMMING IN C, Oxford University, 3rd Edition, 2023.
2. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, 2nd Edition, Prentice Hall of India, 2015.

Web links and Video Lectures (e-Resources):

- Problem Solving through Programming in C:
<https://nptel.ac.in/courses/106105171>
- C for Everyone, Part 1: Programming Fundamentals:
<https://www.coursera.org/learn/c-for-everyone>
- C Tutorial: <https://www.w3schools.com/c/>
- Interactive C tutorial: <https://www.learn-c.org/>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Chalk-and-Talk blended with Live IDE Coding
- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- ICT-Enabled Teaching

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks, i.e., 20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include a **maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Algorithm, Flowchart and Program Demonstration: Prepare algorithms and flowcharts for selected problems, implement them in C, and demonstrate program execution with explanation.	10
2.	Programming Assignment: Develop and document C programs covering decision making, looping, arrays, functions, strings, structures, and pointers.	15

Rubrics for Learning Activity

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Clarity & Simplicity of algorithm/program [C01] [P09]	Algorithms and flowcharts are exceptionally logical and self-explanatory. Program structures are highly optimized with no ambiguity.	Logic and code structures are clear and specific. Only minor ambiguities or structural gaps exist.	Logic is acceptable but could be tighter. Program contains moderate ambiguity or redundant steps.	Code or logic lacks clear structure. The approach is vague with high structural ambiguity.	Solution is chaotic, incomplete, or irrelevant to the given programming problem.
Appropriate Use of language constructs and design of algorithm/program [C02-5] [P01, P03]	Demonstrates highly advanced, precise, and creative use of operators, control structures, loops, functions, pointers, or structures.	Applies language constructs correctly with minor gaps or occasional missed opportunities for optimization.	Uses the correct constructs but displays partial understanding or inconsistent structural execution.	Shows weak or faulty understanding of C constructs. Erroneous usage of conditional/loop rules.	No evidence of correct or relevant programming constructs usage. The program fails basic logic rules.
Compilation, Debugging, Analysis & Comparison of Results for various cases. [C02-5] [P02, P04, P05]	Compiles and debugs flawlessly. Provides exhaustive test cases and rich comparative analysis of execution results.	Compiles successfully. Provides reliable results with good analysis across multiple execution test cases.	Compiles with minor warnings. Results are correct but testing cases and data analysis are shallow.	Frequent runtime/logic bugs. Provides minimal analysis of output data across varied cases.	Fails to compile properly or results are incorrect. No functional analysis or bug fixes attempted.
Creativity, efficiency of Problem-Solving/program [C02-5] [P03, P011]	Shows breakthrough creativity in algorithm design. Program utilizes highly optimized logic and resource-efficient execution.	Displays creative approaches and good logic efficiency. Program solutions are robust and highly practical.	Demonstrates functional problem-solving but relies heavily on standard, non-optimized textbook approaches.	Minimal optimization. Program logic is repetitive, unimaginative, or highly inefficient in execution.	No logical problem-solving or coding ingenuity is evident in the submitted work.
Documentation & Reflection [C01-5] [P08, P09, P011]	Comments and documentation are completely structured, clean, and offer brilliant reflection on code optimization.	Code comments are complete and clear, featuring good overall reflection on code refinements.	Documentation is present but brief. Reflection lacks constructive depth on debugging iterations.	Documentation is messy and incomplete. Reflection on code fixes is minimal or absent.	Completely missing documentation, code comments, or activity reflections as scheduled.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Algorithm, Flowchart and Program Demonstration for selected real-world problems.	10
2.	Problem Solving Exercises using Operators, Control Statements, Arrays, Strings, Functions, Structures, and Pointers.	18

SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.

Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Course Completion – C Programming https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384323703937433634517_share_d/overview	20

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.

3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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Fundamentals of Mathematics			
Course Code	1BBCA105	Scheme	2026
Type of Course	PCC	Semester	I
Teaching Hours/Week (L:T:P)	42(3:0:0)	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	90(42: 0 : 0 : 48)	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	3
Course outcome (Course Skill Set) At the end of the course, the student will be able to: CO1: Apply number systems, logarithms, and algebraic techniques to solve linear, quadratic, and simultaneous equations. CO2: Perform matrix operations, evaluate determinants, compute inverses, and solve systems of linear equations using matrix methods. CO3: Analyze sets, relations, and functions to model mathematical and computational problems. CO4: Apply counting principles, permutations, combinations, and probability concepts to solve real-life and computing-related problems. CO5: Apply differential calculus to evaluate limits, derivatives, and solve optimization problems involving maxima and minima.			
Module-1: Basic Algebra			
Number systems and operations- Binary numbers, Number based conversion, Octal and hexadecimal numbers, Indices and logarithms. Equations- Linear and quadratic equations, Simultaneous equations containing two and three unknowns.			
			Number of Hours:08
Module-2: Matrices and Determinants			
Matrices-Introduction to matrices, types of matrices, Matrix operations, Transpose Determinants- Evaluations of determinants of order (2×2 and 3×3), Minors, Cofactors, Adjoin and inverse of a matrix of order (2×2 and 3×3).			
Module-3: Set Theory and Functions			
Set Theory-Operations on sets, power set, Venn diagram, Cartesian product, relations. Functions-Domain and Range ,types of functions, composite and inverse functions			
			Number of Hours:08
Module-4: Probability			
Principle of counting, Permutation, Combination, Basic terminologies of probabilities, Probability and set notations, Addition and multiplication law of probability, conditional probability and Baye's Theorem.			
			Number of Hours:09
Module-5: Differential calculus			
Differential calculus: Functions and limits -Simple Differentiation of Algebraic Functions – Evaluation of First and Second Order Derivatives– Maxima and Minima			
			Number of Hours:08
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):			
Text books:			
1. B. S. Grewal, Higher Engineering Mathematics, 45th Edition, Khanna Publishers.			

2. R. S. Aggarwal, Quantitative Aptitude, S. Chand Publishing.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publishing.

Reference books / Manuals:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley India.
2. Seymour Lipschutz and Marc Lipson, Schaum's Outline of Linear Algebra, McGraw-Hill.
3. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw-Hill.

Web links and Video Lectures (e-Resources):

- Engineering Mathematics – NPTEL: <https://nptel.ac.in/courses/111106101>
- Discrete Mathematics – NPTEL: <https://nptel.ac.in/courses/106106183>
- Probability and Statistics – NPTEL: <https://nptel.ac.in/courses/111105041>
- SWAYAM – <https://swayam.gov.in>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. **Flipped Classroom Approach**- Students review video lectures and reading materials on algebra, matrices, probability, and calculus before class. Classroom sessions focus on concept clarification, problem-solving, and discussion.
2. **Problem-Based Learning (PBL)**- Real-life and computing-related problems involving number systems, matrices, sets, probability, and optimization are assigned for collaborative analysis and solution.
3. **ICT-Enabled Teaching**-Use of Python, GeoGebra, Desmos, spreadsheets, and online mathematical tools to visualize functions, matrices, probability distributions, and differential calculus concepts.
4. **Collaborative Learning**-Group assignments, peer discussions, and presentations on applications of mathematics in computer science, data analysis, cryptography, and algorithm design.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks, i.e., 20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests (IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include **a maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Assignment at RBL3 and RBL4 levels based on Team Work(TW) activities.	10
2.	GATE-based Aptitude Test.	15

Rubrics for Learning Activity–1: Assignment (10 Marks):

Performance Indicator	Superior (10)	Good (8)	Fair (6)	Needs Improvement (5)
Understanding of Concepts	Demonstrates excellent conceptual clarity and application	Good understanding with minor errors	Basic understanding	Poor understanding
Problem Solving Ability	Solves all problems correctly with proper methodology	Solves most problems correctly	Partial solutions with errors	Unable to solve problems effectively
Mathematical Accuracy	Calculations and derivations are error-free	Minor computational errors	Several errors	Significant errors
Presentation & Organization	Well-structured, neat, and professionally presented	Organized with minor deficiencies	Average presentation	Poor presentation

Rubrics for Learning Activity–2: GATE-Based Aptitude Test (15 Marks):

Performance Indicator	Superior (15)	Good (12)	Fair (10)	Needs Improvement (8)
Quantitative Aptitude	≥90% correct responses	75–89% correct	60–74% correct	<60% correct
Analytical Thinking	Excellent logical reasoning and interpretation	Good reasoning ability	Moderate reasoning	Weak reasoning
Time Management	Completes all questions within allotted time	Completes most questions	Requires additional time	Unable to complete
Accuracy & Precision	Very high accuracy	Good accuracy	Moderate accuracy	Low accuracy

Term Work (TW) and Self Learning (SL) components in Number of Hours per semester		
Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)		
Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Assignment on Number Systems and Algebraic Equations	6
2.	Problem Solving using Matrices and Determinants	6
3.	Probability-based Case Study using Real-life Data	6
4.	Seminar on Mathematical Concepts used in Computer Science	6
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Study Binary, Octal and Hexadecimal Number Systems through NPTEL/SWAYAM	6
2.	Explore Applications of Sets and Relations in Database Systems	6
3.	Solve Aptitude Problems on Permutations and Probability	6
4.	Learn Basics of Differential Calculus using MOOCs	6

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

Fundamentals of Accountancy			
Course Code	1BBCA106	Scheme	2026
Type of Course	PCC	Semester	I
Teaching Hours/Week (L:T:P)	3 : 0 : 0	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	42 : 00 : 00 : 48	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to: CO 1. Explain the fundamentals of accounting principles and systems. CO 2. Prepare journal entries, ledger accounts, and trial balance. CO 3. Record transactions using subsidiary books and negotiable instruments. CO 4. Prepare Bank Reconciliation Statements and classify capital and revenue items. CO 5. Prepare final accounts with necessary adjustments.			
Module-1			
Meaning and Scope of Accounting: Need for Accounting, Development of Accounting, Definition and Functions of Accounting, Book-Keeping and Accounting, Is Accounting a 'Science' or an 'Art?', End Users of Accounting Information, Accounting and Other Disciplines, Role of the Accountant, Accountants' Services, Branches of Accounting, Difference between Management Accounting and Financial Accounting, Objectives of Accounting, Outsourcing of Accounting Function, Accounting as an Information System. Accounting Principles: Meaning of Accounting Principles, Accounting Concepts, Accounting Conventions, Accounting Standards and International Accounting Standards Committee/Board, Accounting Principles and the Institute of Chartered Accountants of India, Applicability of Accounting Standards, AS 1: Disclosure of Accounting Policies, IFRS—Convergence in India, Indian Accounting Standard (Ind AS) 1, Difference between AS 1 and Ind AS 1 Regarding Accounting Principles, Systems of Book-Keeping, Systems of Accounting. Textbook 1: Chapter 1, 2 Number of Hours: 08			
Module-2			
Journalizing Transactions: Journal, Rules of Debit and Credit, Compound Journal Entry, Opening Entry. Ledger Posting and Trial Balance: Ledger, Posting, Rules Regarding Posting, Trial Balance. Textbook 1: Chapter 3, 4 Number of Hours: 08			
Module-3			
Sub-Division of Journal: Need to Sub-Divide the Journal, Types of Journal, Cash Journal, Petty Cash Book, Purchases Journal, Sales Journal, Sales Returns Journal, Purchases Returns Journal. Negotiable Instruments: Promissory Note, Bill of Exchange, Cheque, Some Important Terms, Accounting Entries, Bills Sent for Collection, Accommodation Bills, Bills Receivable and Payable Books.			

Textbook 1: Chapter 5, 6	Number of Hours: 08
Module-4	
Bank Reconciliation Statement: Advantages of Keeping a Bank Account, Causes of Difference, Meaning and Objective of Bank Reconciliation Statement, Importance of Bank Reconciliation Statement, Technique of Preparing Bank Reconciliation Statement. Matching Concept: Learning Objectives, Components of Matching, Problems in Matching, Period of Recognition, Determination of Amount of Expense, AS 9—Revenue Recognition. Capital and Revenue: Learning Objectives, Classification of Income, Classification of Expenditure, Classification of Receipts.	
Textbook 1: Chapter 7, 8, 9	Number of Hours: 09
Module-5	
FINAL ACCOUNTS: Trading Account, Profit and Loss Account, Manufacturing Account, Balance Sheet, Adjustment Entries, Work Sheet. Textbook 1: Chapter 10	
	Number of Hours: 09
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):	
Text books: 1. Dr. S N Maheshwari, Dr. Suneel K Maheshwari, CA Sharad K Maheshwari, Advanced Accountancy, Volume I, 11th Revised & Enlarged Edition, Vikas Publishing House Pvt Ltd, 2023.	
Reference books / Manuals: 1. S. P. Jain and K. L. Narang, Financial Accounting, 9th Edition, Kalyani Publishers, 2021. 2. T. S. Reddy and A. Murthy, Financial Accounting, 6th Edition, Margham Publications, 2021. 3. Mike Piper, Accounting Made Simple: Accounting Explained in 100 Pages or Less, Simple Subjects, LLC, 2022.	
Web links and Video Lectures (e-Resources):	
• Accounting Fundamentals: http://ndl.iitkgp.ac.in/he_document/dishtvo/dishtavo/D_D_I_S_F_H_T_A_V_O_B_O_C_P_A_P_O_A_C_889806911 • Accounting & Financial Analysis: http://ndl.iitkgp.ac.in/he_document/inflibnet_epgp/inflibnet_epgp/IN_I_e_P_P_1_M_30733_P_0_A_F_A_30817_30818 • Financial Accounting : https://www.youtube.com/watch?v=Hs-U3jAvqo4&list=PLYqSpQzTE6M-DlbYhV1psqEz8xlpbhTgs	

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Interactive Lectures
- Problem-Solving Sessions
- Case Study-Based Learning
- Spreadsheet-Based Demonstrations (Excel/LibreOffice Calc)
- Activity-Based Learning
- Collaborative Learning
- ICT-Enabled Teaching
- Flipped Classroom Approach

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks, i.e., 20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include a **maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Accounting Problem Solving and Workbook Preparation: Solve accounting problems involving journal entries, ledger posting, trial balance, subsidiary books, bank reconciliation statements, and final accounts. Maintain a systematic workbook with proper accounting format and working notes	10
2.	Case Study and Spreadsheet-Based Financial Statement Preparation: Analyze simple business transactions, prepare accounting records and financial statements using spreadsheet software (Microsoft Excel/LibreOffice Calc), and interpret the financial results through a brief report and presentation.	15

Rubrics for Learning Activity (Based on the nature of learning activity, design the rubrics for each activity):

Performance Indicators (CO/PO Mapping)	Superior	Good	Fair	Needs Improvement	Unacceptable
Understanding of Accounting Concepts (CO1, PO1)	Demonstrates comprehensive understanding of accounting principles and concepts with accurate application.	Demonstrates good understanding with minor conceptual errors.	Demonstrates satisfactory understanding with occasional errors.	Demonstrates limited understanding requiring guidance.	Demonstrates inadequate understanding of accounting concepts.
Problem Solving and Accuracy (CO4, PO2)	Solves accounting problems accurately using appropriate procedures and calculations.	Solves most problems correctly with minor errors.	Solves basic problems with moderate accuracy.	Difficulty in solving problems with frequent errors.	Unable to solve accounting problems correctly.
Analysis of Business Transactions (CO3, CO4, PO2)	Accurately analyzes all business transactions and applies appropriate accounting principles.	Analyzes transactions correctly with minor omissions.	Demonstrates satisfactory analysis with some inaccuracies.	Demonstrates limited analytical ability requiring guidance.	Unable to analyze business transactions correctly.
Spreadsheet Design and Implementation (CO5, PO5)	Effectively utilizes spreadsheet features, formulas, functions, formatting, and charts.	Uses spreadsheet tools correctly with minor errors.	Demonstrates satisfactory use of spreadsheet features.	Limited use of spreadsheet functions with several errors.	Unable to develop the spreadsheet application satisfactorily.
Preparation of Financial Statements (CO5, PO2)	Financial statements are accurate, complete, and professionally presented.	Financial statements are mostly accurate with few errors.	Financial statements are satisfactory with noticeable errors.	Financial statements are incomplete or poorly prepared.	Unable to prepare financial statements correctly.
Technical Report and Presentation (CO5, PO10)	Report is comprehensive, well-structured, and professionally presented.	Report is well-organized with minor deficiencies.	Report is satisfactory with acceptable documentation.	Report lacks clarity and organization.	Report is incomplete or not submitted.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Accounting Workbook Preparation: Prepare a workbook containing journal entries, ledger accounts, trial balance, subsidiary books, Bank Reconciliation Statement, and final accounts for a given set of business transactions.	14
2.	Spreadsheet-Based Accounting Case Study: Develop accounting worksheets and financial statements using spreadsheet software (Microsoft Excel/LibreOffice Calc) for a simple business case, incorporating formulas, functions, formatting, and charts wherever applicable.	14

SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.

Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Complete any one online course on spreadsheet applications, digital productivity tools, financial literacy, or professional skills from FutureSkills Prime, SWAYAM, NPTEL, or equivalent platforms, and submit a learning summary	20

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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PROGRAMMING USING C LAB		Scheme	2026
Course Code	1BBCAL107	Semester	I
Teaching Hours/Week (L:T:P)	1 : 0 : 2	CIE Marks	50
Total Hours of Pedagogy L:T:P:SLTW	14 : 0 : 28 : 18	SEE Marks	50
Credits	2	Total Marks	100
Examination type (SEE)	Practical	Exam Hours	3
Course outcome (Course Skill Set) At the end of the course, the student will be able to: CO 1. Write and execute basic C programs using variables and input/output operations. CO 2. Implement conditional statements and loops to solve simple logic problems. CO 3. Develop programs using arrays and built-in string functions. CO 4. Design modular code using custom user-defined functions. CO 5. Build programs using structures and pointers for simple data handling.			
Note: - The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100. - Both PART-A and PART-B are considered for CIE and SEE. - Students have to answer 1(one) question from PART-A and 1(one) question from PART-B. - The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks. - The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks. - For Continuous Internal Evaluation (CIE) during the semester, classwork shall typically include open-ended questions from Part-B, along with other similar questions designed to enhance the students' skills.			
Recommended Platform for Execution of Programs: - Text Editor: Any suitable text editor - Compiler: GCC (GNU Compiler Collection) - Debugger: GNU Debugger (GDB) <i>Program development IDEs such as Code::Block, Visual Studio Code shall be avoided.</i>			
PART – A FIXED SET OF EXPERIMENTS			
- Write a menu driven C program to calculate either the area of a circle, area of a rectangle, or area of a triangle and print the results on the screen. - Write a menu-driven C program that takes two numbers and lets the user choose to either find the largest of the two numbers or check if the first number is Even or Odd. - Write an interactive C program that displays the multiplication table of a number chosen by the user and continues to do so until user decides to exit. - Write a C program to store the marks of 5 subjects of a student in a one-dimensional array. Calculate and display the total marks, average marks, and highest marks scored.			

5. Write a C program to read a user's first name. Use built-in string functions to find the length of the name, copy it to a backup variable. Reverse the characters of the name and find whether it is palindrome or not.
6. Write a modular C program with user-defined functions to demonstrate Pass by Value and Pass by Reference.

PART – B OPEN ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Design a student grading system that accepts marks for five subjects, calculates and prints the total percentage, and evaluates the final status as "Fail" if any subject mark falls below 40, or "Pass" otherwise.
2. Design a menu-driven four-function calculator system that continuously processes arithmetic operations (+, -, *, /) inside a loop until the user explicitly enters a specific value (such as 0) to terminate the program.
3. Design an array-based system to store 'n' integers, search for a user-inputted target number, and determine its existence along with its total count.
4. Design a modular banking management system initialized with a starting balance of Rs. 1000, utilizing distinct user-defined functions for deposit() and withdraw() to dynamically update and display the account balance based on user interaction.
5. Design a data management system using an array of structures to store and process records for 'n' entities (such as students or employees), enabling users to input data and display the complete registry in a tabular format.
6. Design a banking utility to manage two separate account balances, utilizing a pointer-based user-defined function to safely transfer a specified fund amount from one account directly into the other.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. E Balaguruswamy, Programming in ANSI C, 9th edition, Tata McGraw Hill Education, 2024.

Reference books / Manuals:

1. Brian W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, 2nd Edition, Prentice Hall of India, 2015.
2. Yashavanth Kanetkar, Let us C, Authentic Guide to C Programming Language, bpb publisher, 17th Edition, 2020.
3. Reema Thareja, Computer Fundamentals and Programming in C, 2nd Edition, 2016.

Web links and Video Lectures (e-Resources):

- Interactive C tutorial: <https://www.learn-c.org/>
- Problem Solving through Programming in C: <https://nptel.ac.in/courses/106105171>
- C for Everyone, Part 1: Programming Fundamentals: <https://www.coursera.org/learn/c-for-everyone>
- C Tutorial: <https://www.w3schools.com/c/>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- ICT-Enabled Teaching

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for **30 marks**. Total marks for the all report shall be scaled down to 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and Marks scored shall be scaled down to **20 marks**. Final average of marks for report and test shall be out of 50 marks.

For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

Rubrics for CIE – Continuous assessment:

Component Evaluation	Superior	Good	Fair	Needs Improvement	Unacceptable
Logic & Algorithm [CO1-5] [PO1]	Flowchart or logic steps are perfectly accurate, clear, and highly	Logic steps are completely correct with very minor inefficiencies	Logic is correct but basic; uses a highly repetitive approach.	Logic contains significant errors or is missing structural steps.	No logical attempt is made, or logic is completely incorrect.

	efficient.				
Code Syntax & Structure [CO1-5] [PO1, PO3]	Code features accurate syntax, ideal indentation, and perfect naming.	Code syntax is correct with minor layout or indentation slips.	Code runs well but uses sloppy formatting and confusing naming.	Code structure is messy and has major structural syntax flaws.	Code is broken, irrelevant, or entirely copied without thought.
Compilation & Debugging [CO2-5] [PO5, PO11]	Program compiles flawlessly on the first try and passes all edge test cases.	Compiles perfectly after correcting a single minor syntax error.	Compiles successfully after major guidance or multiple attempts.	Code produces heavy compilation or runtime crashes.	Fails to compile entirely and no debugging effort was made.
Lab Record & Comments [CO1-5] [PO9]	Lab record is neat, fully complete, and features descriptive comments.	Lab record is complete with brief, clear inline code comments.	Record is complete but missing line comments or clean formatting.	Record submission is incomplete, disorganized, or late.	No lab record or documentation is presented for evaluation.
Viva-Voce & Understanding [CO1-5] [PO9, PO11]	Explains line-by-line execution logic perfectly with absolute confidence.	Answers question prompts correctly with only minor hesitation.	Explains basic logic parts but struggles with core syntax concepts.	Unable to explain how the code works when asked by faculty.	Fails to answer basic questions or skipped oral verification.

Rubrics for SEE / CIE Test:

Component Evaluation	Superior	Good	Fair	Needs Improvement	Unacceptable
Part A: Write-up & Logic [CO1-5] [PO1]	Algorithm and flowchart are completely logical, self-explanatory, and well-structured.	Steps are clear and correct; features minor structural or layout slips.	Logic is acceptable but basic; contains moderate ambiguity or redundant steps.	Write-up is vague, unorganized, and lacks critical structural logic.	Completely missing, incomplete, or irrelevant to the assigned problem.

Part A: Syntax & Structure [CO1-5] [PO1, PO3]	Demonstrates precise, clean usage of C syntax, correct constructs, and ideal formatting.	Applies programming constructs correctly with minor layout or variable choice gaps.	Uses correct constructs but displays partial understanding or sloppy indentation.	Weak understanding of constructs; heavy syntax errors and missing lines.	No evidence of correct syntax; code is broken, fragmented, or empty.
Part A: Execution & Output [CO2-5] [PO4, PO5]	Compiles flawlessly on first try; provides perfect, verified outputs for multiple test cases.	Compiles successfully with minor warnings; correct results with clean outputs.	Compiles after major guidance; results are correct but data presentation is shallow.	Frequent runtime bugs or crashes; outputs are incomplete or partially incorrect.	Fails to compile entirely or outputs are wrong; no execution achieved.
Part A: Concluding Viva-Voce [CO1-5] [PO9, PO11]	Explains line-by-line code logic perfectly with absolute confidence and clear concept depth.	Answers core question prompts correctly with only minor hesitation.	Explains basic parts of the logic but struggles with deep technical definitions.	Minimal understanding; unable to explain how their own written code functions.	Fails to answer basic questions or completely skipped oral verification.
Part B: Open-Ended Logic Design [CO1-5] [PO1]	Formulates a breakthrough, highly innovative, and structured solution to the challenge.	Displays strong problem-solving logic; solution approach is practical and clear.	Demonstrates functional logic but relies heavily on standard, basic patterns.	Logic is repetitive, unimaginative, or highly inefficient in its approach.	No logical problem-solving or structural concept design is evident.
Part B: Open-Ended Execution [CO2-5] [PO3, PO11]	Flawless construct implementation with highly clean and optimized code writing.	Code functions perfectly with minor optimization or formatting oversights.	Program works but uses basic or redundant logic loops to solve the issue.	Weak construct deployment; code is incomplete or barely addresses the target task.	Completely broken implementation; code fails basic functional programming rules.
Part B: Open-Ended Case Testing [CO2-5]	Exhaustive output testing; successfully handles all standard and extreme edge inputs.	Reliable testing; gives correct outputs across standard multi-case	Basic testing; gives correct results but misses complex input validation	Minimal testing; program fails to deliver correct values for basic data sets.	No valid output testing or results presented for verification.

[PO4, PO5]		data inputs.	loops.		
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- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks, i.e., 20 marks.**
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks, i.e., 18 marks.**
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks.**

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ENVIRONMENTAL STUDIES		SEMESTER	I
Course Code	1BBCA109	CIE Marks	50
Teaching Hours/Week (L: P: SDA)	0:2:0	SEE Marks	50
Total Hours of Pedagogy	24	Total Marks	100
Credits	01	Exam Hours	03
Type of Course /Subject	Theory(MCQ)		
COURSE OBJECTIVES:			
- To explore methods for the sustainable use and conservation of resources such as water, soil, minerals, and biodiversity. - To explore the social, economic, and ethical dimensions of environmental issues.			
MODULE-1			
Introduction to Environmental Studies: Multidisciplinary nature of environmental studies. Scope and importance; Concept of sustainability and sustainable development.			
Ecosystems: What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:			
a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)			
Natural Resources: Renewable and Non-Renewable Resources			
a) Land resources and land-use change; Land degradation, soil erosion and desertification. b) Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. c) Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (International & Inter-state). d) Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.			
MODULE-2			

Biodiversity and Conservation a) Levels of biological diversity: Genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hotspots. b) India as a mega-biodiversity nation; Endangered and endemic species of India. c) Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. d) Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.
MODULE-3
Environmental Pollution a) Environmental Pollution: Types, causes, effects and controls; Air, water, soil and noise pollution. b) Nuclear hazards and human health risks. c) Solid waste management, Control measures of urban and industrial waste. d) Pollution case student system; Banking complaints and Ombudsman e) Pollution case student system; Banking complaints and Ombudsman
MODULE-4
Environmental Policies and Practices a) Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. b) Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife (Protection) Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). c) Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.
MODULE-5
Human Communities and the Environment

- a) Human population growth: Impacts on environment, human health and welfare.
- b) Resettlement and rehabilitation of project affected persons; case studies.
- c) Disaster management: Floods, Earthquake, Cyclones and Landslides.
- d) Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- e) Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- f) Environmental communication and public awareness, case studies (e.g., CNG vehicles in cities).

Teaching Methodology: Chalk and talk method / PowerPoint Presentation

COURSE OUTCOMES:

- CO 1.** To understand the roles and responsibilities of various stakeholders in environmental management and policy-making.
- CO 2.** To teach the principles and practices of natural resource conservation and management.
- CO 3.** To provide an understanding of the structure and function of natural ecosystems and the relationships between organisms and their environment.
- CO 4.** To analyze the impact of human activities on the environment, including urbanization, industrialization, deforestation, and climate change.

Suggested Learning Resources:

Books

- 1. Bharucha, E. (2015). Textbook of Environmental Studies.
- 2. Carson, R. (2002). Silent Spring. Houghton Mifflin Harcourt.
- 3. Climate Change: Science and Politics. (2021). Centre Science and Environment, New Delhi.
- 4. Gadgil, M., & Guha, R. (1993). This Fissured Land: An Ecological History of India. Univ. of California Press

UNIX AND SHELL SCRIPTING			
Course Code	1BBCA201	Scheme	2026
Type of course	IPCC	Semester	II
Teaching Hours/Week (L:T:P)	3 : 0 : 2	CIE Marks	50
Total Hours of Pedagogy L:T:P:SL:TW	42 : 0 : 28 : 50	SEE Marks	50
Credits	4	Total Marks	100
Type of Examination (IPCC):	Theory- CIE +SEE, and Lab- CIE only.	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to:			
CO 1. Demonstrate the use of UNIX commands and utilities for file, directory, and system management.			
CO 2. Apply file system concepts, security mechanisms, permissions, and process management techniques in UNIX environments.			
CO 3. Utilize shell features, environment variables, redirection, pipes, and command-line tools effectively.			
CO 4. Develop shell scripts using decision-making, looping, and other scripting constructs to automate tasks.			
CO 5. Apply filters, regular expressions, and text-processing utilities to solve practical problems in UNIX systems.			
Module-1			
Introduction of UNIX and Command Usage - Why UNIX?, Computer System, The UNIX Environment, UNIX structure, Assessing UNIX, Commands, Common Commands- date, cal, who, passwd, echo, man, whoami Other useful commands- tty, clear, stty, script, uname, bc.			
Textbook 2: Chapter 1.1 - 1.8		Number of Hours: 08	
Module-2			
File Systems – Filenames, File Types, Regular files, Directories, File System Implementation, Operations Unique to Directories, Operations Unique to Regular Files, Operations common to both.			
Textbook 2: Chapter 3.1- 3.8		Number of Hours: 08	
Module-3			
Security and File Permissions: User and Groups, Security levels, Changing Permissions, User Masks, Changing Ownership and groups.			
Process: Basics, ps, System Process, Mechanism Of Process Creation, Internal and External Commands, Process States and Zombies, Running Jobs in Background, nice, killing process, job control, at & batch, cron, time.			
Textbook 2: Chapter 4.1- 4.5, Textbook 1: Chapter 9.1 – 9.13		Number of Hours: 09	
Module-4			
Shell Programming: Shell Interpretive Cycle, Shell Offering, Pattern Matching, Escaping and Quoting, Redirection, Pipes, tee, Command substitution, Shell variables, Environment Variables, Common Environment Variables, Shell Scripts, Read, Command Line Arguments			

exit, Logical Operators, if-conditional, Using test[], case Conditional, expr, \$0, while, for, set & shift, The Here Document, trap, Debugging Shell Scripts.

Textbook 1: Chapter 8.1 – 8.5, 8.7-8.10, 10.2, 10.3, 14.1 – 14.16

Number of Hours: 09

Module-5

Filters: The Sample database, pr, head, tail, cut, paste, sort, uniq, tr

Regular Expressions: grep, Basic Regular Expressions, Extended Regular Expressions, sed, Line Addressing Using Multiple Instructions, Context Addressing, Writing selected lines to a file, text editing, Substitution.

Textbook 1: Chapter 12.1-12.9, 13.1 – 13.10

Number of Hours: 08

PRACTICAL COMPONENTS OF IPCC

Bash can be used on a UNIX/Linux Platforms for executing the experiments.

FIXED SET OF EXPERIMENTS

1. Write a shell script to display the current logged-in user, the current date and time in DD-MM-YYYY format, the current working directory, and the system architecture information.
2. Write a shell script to count the total number of files in the current directory and dynamically create a backup directory named using the current system date via command substitution.
3. Write a shell script that accepts a filename as a command-line argument and uses file testing operators to validate whether the file exists, whether it is a regular file or directory, and lists its active read-write-execute permissions.
4. Write a shell script to accept student marks for a subject and use an if-else ladder to assign grades (Distinction, First Class, Second Class, or Fail), and extend it using a case statement to display a corresponding feedback remark.
5. Write a shell script to find the sum of digits of a given number using a while loop, and generate the multiplication table of that number using a for loop.
6. Write a shell script to find the factorial of a number using a user-defined function, passing the target number as a command-line argument.
7. Write a menu-driven shell script using a case statement and a loop to perform basic arithmetic operations (Addition, Subtraction, Multiplication, and Division) based on user choice.
8. Write a shell script to display the first 5 lines and last 5 lines of a given text file, sort the combined output alphabetically, and save the result into a new file using pipes and filters.
9. Write a shell script that uses grep to count the total number of times a specific word

(entered by the user) appears in a text file, and display the line numbers where that word occurs.

10. Write an automation shell script that accepts a directory path as input, checks if it exists, and automatically converts all lowercase filenames within that directory into uppercase letters using tr.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. Sumitabha Das, UNIX: Concepts and Applications, 4th Ed, McGraw Hill Education, 2017.
2. Behrouz A. Forouzan, Richard F. Gilberg, UNIX and Shell Programming: A Textbook, 1st Ed, Cenage Learning, 2003.

Reference books / Manuals:

1. Richard Blum and Christine Bresnahan, Linux Command Line and Shell Scripting Bible, 4th Edition, Wiley, 2020.
2. Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, and Dan Mackin, UNIX and Linux System Administration Handbook, 5th Edition, Addison-Wesley, 2017.

Web links and Video Lectures (e-Resources):

- UNIX Basics: <https://nptel.ac.in/courses/117106113>
- UNIX / LINUX Tutorial: <https://www.tutorialspoint.com/unix/index.htm>
- Shell Scripting: <https://www.futureskillsprime.in/course/operating-systems-and-shell-scripting/>
- Bash Tutorial: <https://www.w3schools.com/bash/>
- Linux Commands and Shell Scripting: <https://www.coursera.org/learn/hands-on-introduction-to-linux-commands-and-shell-scripting>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Interactive demonstration of UNIX commands and utilities in Linux environment.
- Hands-on laboratory sessions using Linux operating systems and shell environments.
- Problem-based learning through command-line and shell scripting exercises.
- Live demonstration of process management, file permissions, and system administration tasks.
- Case studies on UNIX system administration and automation.
- Mini-projects involving shell script development and system utilities.
- Peer learning through collaborative scripting activities.
- Open-ended laboratory exercises for real-world problem solving.

- Self-learning through online tutorials, NPTEL lectures, and Linux documentation.
- Debugging and code review sessions for shell scripts.

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE Theory component will be **25 marks** and CIE Practical component will be **25 marks**.

The CIE Theory component consists of IA tests for 25 marks. The CIE Practical component for continuous assessments will be for 15 marks through rubrics and for lab tests will be for 10 marks.

- To qualify and become eligible to appear for SEE, in the **CIE theory component**, a student must score at least **40% of 25 marks**, i.e., **10 marks**.
- To qualify and become eligible to appear for SEE, in the **CIE Practical component**, a student must secure **a minimum of 40% of 25 marks**, i.e., **10 marks**.
- To pass the **SEE**, a student must secure **a minimum of 35% of 50 marks**, i.e., **18 marks**.
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks**.

CIE Practical component:

The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for 30 marks. The summation of all the experiments marks to be scaled down to 15 marks.

The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and scaled down to 10 marks. For laboratory test, the student is required to conduct one

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include **a maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Develop shell scripts integrating UNIX commands, file management, process management, shell programming constructs, filters, and regular expressions to solve specified problems. Demonstrate the execution, explain the script logic, debugging process, and interpret the output.	15
2.	Design and develop a shell script-based automation solution for a real-world system administration or file-processing task (such as file backup, log analysis, user account reporting, disk usage monitoring, file synchronization, or report generation), prepare technical documentation, and present the implementation.	10

Rubrics for Learning Activity (Based on the nature of learning activity, design the rubrics for each activity):

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Understanding of UNIX Environment, Commands and File System Concepts [C01, C02] [P01]	Demonstrates comprehensive understanding of UNIX architecture, commands, file systems, and utilities with excellent technical accuracy and	Demonstrates strong understanding with very minor conceptual gaps.	Demonstrates satisfactory understanding of concepts.	Understanding is limited and partially incorrect.	Unable to explain fundamental concepts.

	examples.				
Analysis of Security, Permissions and Process Management Concepts [C02] [P02, P04]	Provides insightful analysis and strong technical justification for security mechanisms and process management techniques.	Provides good analysis with minor omissions.	Analysis is acceptable but lacks depth.	Limited analytical ability and weak interpretation.	No meaningful analysis attempted.
Application of UNIX Commands and Utilities [C01, C03] [P01, P05]	Correctly applies UNIX commands and utilities independently to solve practical problems efficiently.	Applies commands correctly with minimal errors.	Applies basic commands with occasional guidance.	Requires frequent assistance during execution.	Unable to execute commands appropriately.
Shell Script Development and Automation Skills [C03, C04] [P03, P05]	Develops efficient, modular, and error-free shell scripts demonstrating strong automation skills.	Develops functional scripts with minor logical or syntax errors.	Develops scripts meeting minimum requirements.	Develops incomplete scripts requiring substantial support.	Unable to develop working shell scripts.
Problem Solving Using Shell Programming, Filters and Regular Expressions [C04, C05] [P02, P03, P04, P05]	Designs innovative solutions and effectively utilizes shell programming, filters, and regular expressions to solve complex problems.	Solves problems effectively using appropriate techniques.	Solves routine problems with moderate guidance.	Demonstrates difficulty in developing solutions.	Unable to solve assigned problems.
Documentation, Reporting and Technical Communication [C01-C05] [P010]	Documentation is complete, well-organized, professional, and technically accurate.	Documentation is complete with minor omissions.	Documentation is adequate but lacks detail.	Documentation is incomplete and poorly organized.	Documentation is absent or unacceptable.
Self-Learning, Laboratory Participation and Professional	Demonstrates exceptional initiative, active participation, and effective utilization of self-learning	Participates regularly and demonstrates good self-	Participates adequately with moderate self-	Limited participation and self-learning initiative.	No meaningful participation or self-learning effort.

Practice [C01-C05] [P09, P012]	resources.	learning ability.	learning effort.		
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Rubrics for CIE – Continuous assessment:

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvem ent	Unaccepta ble
Conceptual Understanding of UNIX Environment, File Systems, Security and Process Management [C01, C02] [P01]	Demonstrates comprehensive understanding of UNIX concepts, file systems, security mechanisms, and process management with excellent technical accuracy.	Demonstrates strong understanding with minor conceptual gaps.	Demonstrates satisfactory understanding of concepts.	Understanding is limited and partially incorrect.	Unable to explain fundamental concepts.
Application of UNIX Commands and System Utilities [C01, C03] [P01, P05]	Applies UNIX commands and utilities independently and accurately to solve practical problems.	Applies commands correctly with minimal errors.	Applies basic commands with occasional guidance.	Requires frequent assistance while executing commands.	Unable to apply UNIX commands effectively.
Shell Script Design and Development Skills [C03, C04] [P03, P05]	Develops efficient, well-structured, reusable, and error-free shell scripts independently.	Develops functional scripts with minor logical or syntax errors.	Develops scripts meeting basic requirements.	Develops incomplete scripts requiring significant assistance.	Unable to develop working shell scripts.
Use of Filters, Regular Expressions and Text Processing Utilities [C05] [P02, P05]	Effectively utilizes filters and regular expressions for complex text processing and data analysis tasks.	Applies text-processing tools correctly with minor errors.	Demonstrates basic usage with occasional guidance.	Limited understanding of text-processing utilities.	Unable to utilize filters or regular expressions effectively.
Participation, Self-Learning and Continuous Engagement [C01-C05] [P09, P012]	Demonstrates exceptional initiative, active participation, and effective utilization of self-learning resources.	Participates regularly and demonstrates good self-learning	Participates adequately with moderate self-learning	Limited participation and self-learning initiative.	No meaningful participation or self-learning effort.

		ability.	effort.		
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Rubrics for SEE / CIE Test:

Component & CO-PO Mapping	Superior	Good	Fair	Needs Improvement	Unacceptable
Understanding of UNIX Concepts and System Operations [C01, C02] [P01]	Demonstrates comprehensive understanding of UNIX concepts, commands, file systems, security, and process management with accurate explanations and examples.	Demonstrates good understanding with minor conceptual gaps.	Demonstrates satisfactory understanding of concepts.	Understanding is limited and partially incorrect.	Unable to explain fundamental concepts.
Analysis of UNIX Environment, Security and Process Management [C02] [P02, P04]	Provides insightful analysis and strong technical justification for system operations and security mechanisms.	Provides good analysis with minor omissions.	Analysis is acceptable but lacks depth.	Limited analytical ability and weak interpretation.	No meaningful analysis attempted.
Application of UNIX Commands and Utilities [C01, C03] [P01, P05]	Correctly applies UNIX commands and utilities to solve complex problems with appropriate command selection and justification.	Applies commands correctly with minor errors.	Applies basic commands adequately.	Demonstrates limited command usage skills.	Unable to apply commands appropriately.
Shell Script Design and Programming Skills [C03, C04] [P03, P05]	Develops efficient, logically correct, and well-structured shell scripts with appropriate use of scripting constructs.	Develops functional scripts with minor logical or syntax errors.	Develops scripts meeting basic requirements.	Develops incomplete or partially correct scripts.	Unable to develop functional shell scripts.
Problem Solving Using Shell	Designs effective solutions and applies filters,	Solves problems correctly	Solves routine problems	Demonstrates limited problem-	Unable to solve assigned

Programming, Filters and Regular Expressions [C04, C05] [P02, P03, P04, P05]	regular expressions, and shell programming techniques accurately.	with minor omissions.	with acceptable accuracy.	solving ability.	problems.
Technical Presentation and Organization of Answers [C01–C05] [P010]	Answers are well-organized, technically precise, logically presented, and supported with relevant examples.	Answers are clear and mostly organized with minor omissions.	Answers are satisfactory but lack detail or clarity.	Answers are poorly organized and incomplete.	Answers are unclear, incorrect, or absent.

Suggested rubrics for Practical continuous assessment:

Performance Indicators & CO-PO Mapping	Excellent	Very Good	Good	Satisfactory
Understanding and Application of UNIX Commands, File Systems and Security Concepts [C01, C02] [P01, P02]	Demonstrates comprehensive understanding and independently applies UNIX commands, file system operations, security, permissions, and process management concepts accurately.	Demonstrates good understanding and applies concepts with minimal errors.	Demonstrates satisfactory understanding and applies concepts with occasional guidance.	Demonstrates limited understanding and requires significant assistance.
Execution of UNIX Commands and Utilities [C01, C03] [P01, P05]	Executes commands accurately and efficiently, producing correct results independently.	Executes most commands correctly with minor errors.	Executes basic commands correctly with occasional assistance.	Requires frequent guidance to execute commands correctly.
Shell Script Development and Programming Skills [C03, C04] [P03, P05]	Develops efficient, well-structured, reusable, and error-free shell scripts independently.	Develops functional shell scripts with minor logical or syntax errors.	Develops scripts meeting basic requirements with moderate guidance.	Develops incomplete scripts requiring substantial support.
Problem Solving	Designs innovative and	Solves	Solves	Demonstrate

and Automation Using Shell Programming [C04, C05] [P02, P03, P04, P05]	effective automated solutions using shell scripting, filters, and regular expressions.	problems effectively using appropriate scripting techniques.	routine problems with moderate guidance.	s limited ability to solve practical problems independently.
Use of Filters, Pipes and Regular Expressions [C05] [P02, P05]	Applies filters, pipes, and regular expressions effectively for complex text-processing and data-analysis tasks.	Correctly uses text-processing utilities for most tasks.	Demonstrate s basic usage with occasional errors.	Has difficulty applying text-processing utilities correctly.
Debugging and Error Handling Skills [C03, C04] [P02, P04]	Identifies, analyzes, and resolves errors independently using systematic debugging techniques.	Resolves most errors with minimal assistance.	Resolves simple errors with moderate guidance.	Requires substantial assistance to identify and correct errors.
Laboratory Performance and Task Completion [C01–C05] [P01, P05]	Completes all assigned laboratory tasks accurately, efficiently, and within the stipulated time.	Completes most tasks correctly with minor issues.	Completes assigned tasks with moderate guidance.	Requires substantial support to complete laboratory activities.
Documentation, Record Maintenance and Technical Reporting [C01–C05] [P010]	Maintains complete, well-organized, professional, and technically accurate laboratory records.	Maintains records with minor omissions.	Maintains adequate records with acceptable documentation.	Documentation is incomplete or poorly organized.
Participation, Self-Learning and Professional Practice [C01–C05] [P09, P012]	Demonstrates exceptional initiative, active participation, and effective utilization of self-learning resources.	Participates regularly and demonstrate s good learning attitude.	Participates adequately with moderate self-learning effort.	Limited participation and learning initiative.
Innovation and Creativity in Open-Ended Experiments [C04, C05] [P03, P04, P012]	Demonstrates creativity by extending solutions beyond requirements and implementing additional features.	Shows initiative in improving solutions beyond basic requirements.	Demonstrate s satisfactory effort in developing solutions.	Relies primarily on provided examples with minimal innovation.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation

- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

Term Work (TW) and Self Learning (SL) components in Number of hours per semester		
Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)		
Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Perform structured laboratory assignments involving UNIX commands, file management, permissions, process management, shell scripting constructs, filters, and regular expressions. Document the scripts, execution results, and observations.	15
2.	Design, implement, test, document, and demonstrate a shell script-based automation solution for a real-world problem such as file backup, log analysis, system monitoring, report generation, or user account management.	15
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Completion of Spoken Tutorials / MOOCs / Online Courses on UNIX/Linux, Shell Programming, Linux Command Line, and System Administration using recognized online learning platforms.	20

Continuous Internal Evaluation (CIE)

(i) Theory component

The CIE marks of 25 shall be earmarked for two tests.

The first test shall be conducted after completing two modules of the syllabus and the second one after completing the rest three modules.

Each test shall be conducted for 25 marks. The average of the two tests scaled down to 25 marks shall constitute the test marks for a maximum of 25 marks.

(ii) Laboratory component

Out of 25 marks, 15 marks shall be assigned for assessment as per the rubrics listed in the course syllabus.

The remaining 10 marks shall be based on the practical test conducted by two Internal examiners appointed by the HoD. The allotment of marks shall be as per the rubrics defined for regular class work and practical test as indicated in the Table – ICs/IPCCs 1.

(i) To qualify and become eligible to appear for the SEE of the IC/IPCC, a student shall secure at least 40 % of 25 marks, i.e., 10 marks, in the CIE theory component, and at least 40 % of 25 marks, i.e., 10 marks in the CIE Practical component.

Table – ICs/IPCCs 1 Distribution of marks		
Component	Description	Marks
Allotment of marks for regular class work		
Ability in Conducting Experiments	Initiative, skill, safety practices, teamwork, and independent handling of equipment during regular lab sessions.	5 marks
Laboratory Record / Journal	Regular and neat maintenance of lab record, accuracy of results, and timely submission.	10 marks
Subtotal		15
Allotment of marks for CIE practical test		
Laboratory Test / Experiment Performance	Ability to set up apparatus, follow procedure, take observations, and obtain correct results in the test experiment.	5 marks
Viva-Voce	Understanding of theory, concepts, and experimental procedure; ability to explain results and answer related questions.	5 marks
Subtotal		10
Total		25

Passing requirement in SEE

For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.

For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.

If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

DATA STRUCTURES USING C			
Course Code	1BBCA202	Scheme	2026
Type of Course	PCC	Semester	II
Teaching Hours/Week (L:T:P)	3 : 0 : 0	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	42 : 0 : 0 : 48	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to: CO 1. Explain the fundamentals of data structures, recursion techniques, and dynamic memory allocation concepts in C. CO 2. Apply array operations, searching techniques, and sorting algorithms to organize and process data efficiently. CO 3. Implement various linked list data structures and perform fundamental operations. CO 4. Utilize stacks and queues to solve computational problems and evaluate arithmetic expressions. CO 5. Implement tree and graph data structures using appropriate representations and traversal techniques.			
Module-1			
Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operations on Data Structures. Recursion: Introduction, Types-Direct and Indirect, Applications-Factorial, GCD, Finding Exponents, Fibonacci Series, Tower of Hanoi. Memory Allocation: Types, Dynamic Memory Allocation, malloc(), calloc(), realloc(), free() functions. Textbook 1: Chapter 2.1, 2.2, 2.3, 7.7.4, Appendix A Number of Hours: 08			
Module-2			
Array: Operations on Arrays - Traversing an Array, Inserting an Element in an Array, Deleting an Element from an Array, Merging Two Arrays, Passing Arrays to Functions Searching and Sorting - Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort. Textbook 1: Chapter 3.5, 3.6, 14.2, 14.3, 14.7, 14.8, 14.9, 14.10 Number of Hours: 09			
Module-3			
Linked Lists: Introduction, Singly Linked Lists-Traversing, Searching, Inserting a Node at the Beginning of a Linked List, Deleting the First Node from a Linked List, Circular Linked Lists - Inserting a Node at the End of a Circular Linked List, Deleting the Last Node from a Circular Linked List, Doubly Linked Lists - Inserting a Node at the Beginning of a Doubly Linked List, Deleting the First Node from a Doubly Linked List. Textbook 1: Chapter 6.1, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.4, 6.3, 6.3.1, 6.3.2, 6.4, 6.4.1, 6.4.2 Number of Hours: 08			
Module-4			

Stack: Introduction, Array Representation Of Stacks, Operations On A Stack-push, pop, peek, Applications of Stacks-Reversing a list, Parentheses Checker, Evaluation of Arithmetic Expressions-Polish Notations, Conversion of an Infix Expression into a Postfix Expression, Evaluation of a Postfix Expression.

Queues: Introduction, Array Representation of Queues, Operations on Queues, Circular Queues, Deques, Priority Queues.

Textbook 1: Chapter 7.1, 7.2, 7.3, 7.7.1, 7.7.2, 7.7.3, 8.1, 8.2, 8.4.1, 8.4.2, 8.4.3

Number of Hours: 09

Module-5

Trees: Introduction, Binary Trees, Complete Binary Trees, Representation of Binary Trees in the Memory, Binary Search Trees, Creating a Binary Tree from a General Tree, Traversing a Binary Tree- PreOrder Traversal, InOrder Traversal, PostOrder Traversal

Graphs: Introduction, Graph Terminology, Directed Graphs, Terminology of a Directed Graph, Representation of Graphs-Adjacency Matrix Representation, Adjacency List Representation.

Textbook 1: chapter 9.1, 9.2.3, 9.2.4, 9.3, 9.4.1, 9.4.2, 9.4.3, 13.1, 13.2, 13.3, 13.3.1, 13.5.1, 13.5.2

Number of Hours: 08

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. Reema Thareja, Data Structures using C, 2nd Ed, Oxford press, 2014.

Reference books / Manuals:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2nd Ed, Universities Press, 2014.
2. Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.
3. Gilberg & Forouzan, Data Structures: A Pseudo-code approach with C, 2nd Ed, Cengage Learning, 2014.

Web links and Video Lectures (e-Resources):

- Data Structures & Algorithms: <https://www.futureskillsprime.in/course/data-structures-algorithms>
- Arrays: https://www.w3schools.com/dsa/dsa_data_arrays.php
- Stack, Queue, LinkedList: <https://nptel.ac.in/courses/106102064>
- Trees: https://www.w3schools.com/dsa/dsa_theory_trees.php
- Graphs: https://www.w3schools.com/dsa/dsa_theory_graphs.php

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Problem-Based Learning (PBL)
- Algorithm Visualization Sessions
- Coding Demonstrations
- Peer Learning Activities
- ICT-Enabled Teaching
- Flipped Classroom
- Collaborative Programming
- Case-Based Learning
- Mini Project-Based Learning

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include a **maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Design algorithms and flowcharts for selected data structure problems, implement them using C, demonstrate the execution of programs involving recursion, arrays, linked lists, stacks, queues, trees, and graphs, and explain the logic and output.	10
2.	Design and develop a small application using appropriate data structures (such as Student Record Management, Library Management, Inventory Management, Expression Evaluation, or Contact Management), analyze the suitability of the chosen data structure, and present the implementation with documentation.	15

Rubrics for Learning Activity (Based on the nature of learning activity, design the rubrics for each activity):

Performance Indicators (CO-PO Mapping)	Superior (4)	Good (3)	Fair (2)	Needs Improvement (1)	Unacceptable (0)
Algorithm Design and Problem Analysis (C01, C02, P01, P02)	Develops a correct, optimized algorithm with excellent problem analysis and logical flow.	Develops a correct algorithm with minor logical issues.	Algorithm solves the problem with moderate guidance.	Incomplete or inefficient algorithm requiring significant improvement.	Unable to design a suitable algorithm.
Program Implementation (C02, C03, P01, P05)	Program is completely correct, modular, well-documented, and executes without errors.	Program executes correctly with minor coding errors or limited documentation.	Program executes with some logical or syntax errors requiring correction.	Program is incomplete or executes with major errors.	Unable to implement the program.
Documentation (C02, C04, P05, P010)	Code is well-structured, properly indented, commented, and professionally documented.	Code is organized with minor documentation deficiencies.	Code is understandable but lacks proper documentation.	Poor code organization and minimal documentation.	Documentation absent or code unacceptable.
Application Development and Functionality (C03, C04, P02, P05)	Application is fully functional, efficient, and demonstrates excellent implementation of data structures.	Application functions correctly with minor issues.	Application demonstrates basic functionality.	Application is incomplete or has significant functional issues.	Application not implemented.
Technical Documentation and Presentation (C04, C05, P09, P010)	Documentation is comprehensive and presentation is clear, professional, and well-organized.	Good documentation and presentation with minor shortcomings.	Satisfactory documentation and presentation.	Limited documentation and presentation quality.	Documentation and presentation absent.
Teamwork / Individual Contribution and Timeliness (C05, P09)	Excellent contribution, timely completion, and active participation.	Good contribution with minor delays.	Satisfactory participation and completion.	Limited participation or delayed completion.	No meaningful contribution or submission.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Programming Assignments on Data Structures: Design algorithms, prepare flowcharts, implement C programs, and demonstrate solutions for problems involving recursion, arrays, linked lists, stacks, queues, trees, and graphs.	10
2.	Mini Project / Case Study: Design, implement, document, and demonstrate a real-world application using appropriate data structures, along with a technical report and presentation.	18
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Course Completion - Data Structures & Algorithms https://www.futureskillsprime.in/course/data-structures-algorithms/	20

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.

2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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INTRODUCTION TO WEB TECHNOLOGIES			
Course Code	1BBCA203	Scheme	2026
Type of Course	PCC	Semester	II
Teaching Hours/Week (L:T:P)	3 : 0 : 0	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	42 : 0 : 0: 48	SEE Marks	50
Credits	03	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	03
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to:			
CO 1. Describe the fundamentals of web technologies and develop structured web pages using HTML.			
CO 2. Design responsive and visually appealing web pages using HTML forms and CSS.			
CO 3. Develop interactive web pages using JavaScript and the Document Object Model.			
CO 4. Design dynamic web documents using JavaScript and XML technologies.			
CO 5. Develop server-side web applications using PHP with form handling, cookies, and session management.			
Module-1			
Fundamentals of Web: Introduction to the Internet, The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators (URLs), MIME, Hypertext Transfer Protocol, Security, The Web Programmer's Toolbox. Origins and Evolution of HTML/XHTML, Basic Syntax, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, and Tables.			
Text Book 1: Ch.1.1-1.9, 2.1-2.8		Number of Hours: 09	
Module-2			
HTML and CSS: Forms, Audio Element, Video Element, Organization Elements, The Time Element, Syntactic Differences between HTML and XHTML. Introduction to CSS, Levels of Style Sheets (CSS), Style Specification formats, Selector Forms, Property-Value Forms, Fonts Properties, Lists Properties, Alignment of Text, Color, Box Model, Background Images, and <div> Tags.			
Text Book 1: Ch.2.9-2.14, 3.1-3.12		Number of Hours: 08	
Module-3			
JavaScript and HTML Documents: Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics, Primitives, Operations, and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions. The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events and Event Handling, Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from Text Box and Password Elements, The DOM 2 Event Model.			
Text Book 1: Ch.4.1-4.9, 5.1-5.8		Number of Hours: 08	
Module-4			
Dynamic Documents with JavaScript and XML: Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Element, Locating the Mouse Cursor, Reacting to Mouse Click, Slow Movement Elements,			

Dragging and Dropping Elements. Introduction to XML, Uses of XML, The Syntax of XML, XML Document Structure, Namespaces, XML Schemas. Text Book 1: Ch.6.1-6.11, 7.1-7.6		Number of Hours: 09
Module-5		
Server-Side Scripting using PHP: Origins and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives, Operations and Expressions, Output, Control Statements, Arrays, Functions, and Pattern Matching, Form Handling, Cookies, and Session Tracking. Text Book 1: Ch.9.1-9.12		Number of Hours: 08
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals): Text books: 1. Robert W. Sebesta, Programming the World Wide Web, 8th Edition, Pearson, 2022. Reference books / Manuals: 1. Paul J. Deitel, Harvey M. Deitel, and Abbey Deitel, Internet & World Wide Web: How to Program, 5th Edition, Pearson Education, 2022. 2. Randy Connolly and Ricardo Hoar, Fundamentals of Web Development, 3rd Edition, Pearson Education, 2022.		
Web links and Video Lectures (e-Resources): • HTML and CSS: https://www.youtube.com/watch?v=h_RftxdJTzs • JavaScript: https://www.w3schools.com/js/default.asp • PHP: http://www.w3schools.com/php/ • PHP Language Reference: http://php.net/manual/en/langref.php		
Teaching-Learning Process (Innovative Delivery Methods): The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes. 1. Flipped Learning Approach 2. Problem-Based Learning.		
Assessment Structure: The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage. • To qualify and become eligible to appear for SEE, in the CIE, a student must score at least 40% of 50 marks, i.e., 20 marks. • To pass the SEE, a student must score at least 35% of 50 marks, i.e., 18 marks. • Notwithstanding the above, a student is considered to have passed the course,		

provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include **a maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Static Website Development: Design and develop a multi-page static website using HTML5 and CSS3 incorporating text formatting, images, tables, forms, hyperlinks, multimedia elements, and responsive page layouts.	10
2.	Interactive Web Application Development: Develop a dynamic web application using JavaScript, DOM manipulation, XML, and PHP incorporating form validation, event handling, session management, and basic server-side processing.	15

Rubrics for Learning Activity					
Performance Indicator	Superior (5)	Good (4)	Fair (3)	Needs Improvement (2)	Unacceptable (1)
Planning and Design	Well-structured design with excellent organization and appropriate use of web technologies.	Good design with logical organization and minor deficiencies.	Adequate design with acceptable organization.	Limited planning with weak organization.	Poor or incomplete design with no clear organization.
Implementation and Functionality	All required features are implemented correctly with error-free execution.	Most features are implemented correctly with minor errors.	Basic features are implemented with some functional issues.	Partial implementation with significant functional errors.	Unable to implement the required functionality.
Application of Concepts	Demonstrates excellent understanding and effective application of HTML, CSS, JavaScript, XML, and PHP concepts.	Demonstrates good understanding with minor conceptual errors.	Demonstrates satisfactory understanding with limited application.	Demonstrates inadequate understanding of concepts.	Shows little or no understanding of the concepts.
Code Quality and Documentation	Well-organized, readable, properly indented code with appropriate comments and documentation.	Code is organized with adequate documentation.	Code is understandable with limited documentation.	Poorly organized code with inadequate documentation.	Unstructured code with no documentation.
Presentation and Demonstration	Confident presentation with clear explanation and successful	Good presentation with satisfactory	Basic presentation with partial	Limited explanation and incomplete	Unable to explain or demonstrate the

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Static Website Development: Design and develop a multi-page static website using HTML5 and CSS3 incorporating text formatting, hyperlinks, tables, multimedia, forms, and responsive page layouts. Document the website design and demonstrate its functionality.	14
2.	Dynamic Web Application Development: Develop an interactive web application using JavaScript, DOM manipulation, XML, and PHP with form validation, event handling, cookies, sessions, and server-side processing. Prepare a technical report and demonstrate the application.	14

SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.

Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Explore official web development resources (such as MDN Web Docs, W3Schools, or PHP Manual) and develop a mini web page demonstrating one modern	20

	HTML5, CSS3, JavaScript, or PHP feature not covered in regular laboratory exercises.	
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Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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Discrete Mathematical Structures			
Course Code	1BBCA204	Scheme	2026
Type of Course	PCC	Semester	II
Teaching Hours/Week (L:T:P)	42(3:0:0)	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	42: 0 : 0 : 48	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	3
Course outcome (Course Skill Set) At the end of the course, the student will be able to: CO1: Apply the principles of propositional logic, predicate logic, and proof techniques to solve logical problems. CO2: Analyze mathematical induction, counting principles, permutations, combinations, and the pigeonhole principle to solve discrete mathematical problems. CO3: Apply the principle of inclusion-exclusion and recurrence relations to model and solve computational problems. CO4: Analyze relations, functions, partial orders, equivalence relations, and Hasse diagrams in mathematical and computing applications. CO5: Apply graph theory concepts, including trees, Euler circuits, graph isomorphism, and weighted trees, to solve problems in computer science.			
Module-1: Fundamentals of Logic			
Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference. The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems Number of Hours:08			
Module-2: Properties of the Integers			
Mathematical Induction -The Well Ordering Principle, Recursive Definitions, The Basics of Counting, The Pigeonhole Principle Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition. Number of Hours:09			
Module-3: The Principle of Inclusion and Exclusion			
The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials. Recurrence Relations: First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients. Number of Hours:09			
Module-4: Relations, Functions			
Cartesian Products and Relations, Functions – Plain and One-to-One, Onto Functions.. Properties of Relations , Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions. Number of Hours:08			
Module-5: Introduction to Graph Theory			
Definitions and Examples , Sub graphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits , Trees: Definitions, Properties, and Examples , Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes			

Number of Hours:08

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):**Text books:**

1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics: An Applied Introduction, 5th Edition, Pearson Education.
2. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw-Hill Education.
3. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill.

Reference books / Manuals:

1. C. L. Liu and D. P. Mohapatra, Elements of Discrete Mathematics, 4th Edition, McGraw-Hill Education.
2. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India.
3. Susanna S. Epp, Discrete Mathematics with Applications, 5th Edition, Cengage Learning.

Web links and Video Lectures (e-Resources):

1. Engineering Discrete Mathematics – <https://nptel.ac.in>
2. Discrete Mathematics – <https://swayam.gov.in>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

1. **Flipped Classroom Approach-** Students study video lectures and reading materials on logic, relations, functions, and graph theory before class. Classroom sessions focus on discussions, proofs, and problem-solving.
2. **Problem-Based Learning (PBL)** -Real-world computing problems involving logic, counting techniques, recurrence relations, and graph theory are assigned for collaborative analysis and solution development.
3. **ICT-Enabled Teaching-** Use of Python, GeoGebra, Graphviz, online graph simulators, and digital learning platforms to visualize graphs, trees, relations, Hasse diagrams, and recurrence relations.
4. **Collaborative Learning-** Group assignments, peer instruction, and seminars on applications of discrete mathematics in computer science, cryptography, artificial intelligence, databases, and networking.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks, i.e., 20 marks.**
- To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks.**
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks.**

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests (IA)** shall be conducted, carrying a total of **25 marks.**

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks.**

It is recommended to include a **maximum of two learning activities** as part of the CCA to foster the **holistic development of students.** These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	Assignment at RBL3 and RBL4 levels based on Team Work(TW) activities.	10
2.	GATE-based Aptitude Test.	15

Rubrics for Learning Activity-1: Assignment (10 Marks):

Performance Indicator	Superior (10)	Good (8)	Fair (6)	Needs Improvement (5)
Understanding of Concepts	Demonstrates excellent conceptual clarity and application	Good understanding with minor errors	Basic understanding	Poor understanding
Problem Solving Ability	Solves all problems correctly with proper methodology	Solves most problems correctly	Partial solutions with errors	Unable to solve problems effectively
Mathematical Accuracy	Calculations and derivations are error-free	Minor computational errors	Several errors	Significant errors
Presentation & Organization	Well-structured, neat, and professionally presented	Organized with minor deficiencies	Average presentation	Poor presentation

Rubrics for Learning Activity–2: GATE-Based Aptitude Test (15 Marks):

Performance Indicator	Superior (15)	Good (12)	Fair (10)	Needs Improvement (8)
Quantitative Aptitude	≥90% correct responses	75–89% correct	60–74% correct	<60% correct
Analytical Thinking	Excellent logical reasoning and interpretation	Good reasoning ability	Moderate reasoning	Weak reasoning
Time Management	Completes all questions within allotted time	Completes most questions	Requires additional time	Unable to complete
Accuracy & Precision	Very high accuracy	Good accuracy	Moderate accuracy	Low accuracy

Term Work (TW) and Self Learning (SL) components in Number of Hours per semester		
Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)		
Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Problem-solving session on Mathematical Induction and Counting Principles	6
2.	Group activity on Relations, Functions and Hasse Diagrams	6
3.	Mini Project on Graph Theory Applications in Computer Networks	6
4.	Seminar on Applications of Discrete Mathematics in Computer Science	6
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Complete NPTEL/SWAYAM modules on Discrete Mathematics	6
2.	Practice problems on Relations, Functions and Graph Theory using online resources	6
3.	Prepare concept maps and summary notes for each module	6
4.	Solve aptitude and competitive programming problems based on discrete mathematics	6

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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INTRODUCTION TO FINTECH			
Course Code	1BBCA205	Scheme	2026
Type of Course	SEC	Semester	II
Teaching Hours/Week (L:T:P)	2 : 0 : 0	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	28 : 0 : 0 : 32	SEE Marks	50
Credits	2	Total Marks	100
Examination type (SEE)	Objective Type (MCQ)	Exam Hours	1
Course Outcomes: At the end of the course, the student will be able to: CO 1. Explain the fundamentals and ecosystem of FinTech. CO 2. Describe FinTech hubs, digital payment systems. CO 3. Explain digital lending and the applications of Artificial Intelligence. CO 4. Describe the role of Machine Learning, Robotic Process Automation (RPA) in financial services. CO 5. Explain the fundamentals of Blockchain technology and Application of Cryptocurrencies in the financial sector.			
Module-1			
Introduction To Fintech: Introduction, Financial Technology: An Understanding, What is FinTech?, Definitions of FinTech, The History and Evolution of the FinTech Industry, FinTech Ecosystem, FinTech’s Most Recent Developments, FinTech Market in India, Fintech Market Trends in India, Types of FinTech or Transformation of Financial Services, Benefits of FinTech, The Drawbacks of FinTech, FinTech’s Key Growth Drivers, Challenges to the Growth of FinTech.			
Textbook 1: Chapter 1		Number of Hours: 5	
Module-2			
Fintech Hubs: Introduction, The Purpose of Financial Hubs / Why do Financial Hubs Exist?, Getting to know a Financial Hub, FinTech Revolution in India, Top Global FinTech Hubs, FinTech Firms in India, Emerging FinTech Hubs. Digital Payments: Introduction, Forms of Digital Payments, Advantages of Digital Payments, Cashless / Cash-free Society, DFS Eco System, What Digital Financial Services hope to Achieve?, Use Cases are the Circumstances in Which Individuals and Organizations, Developing Countries and DFS, The Story of Mobile Money, RTGS Networks, RTGS Transaction Benefits.			
Textbook 1: Chapter 2, 9		Number of Hours: 5	
Module-3			
Digital Lending: Introduction, FinTech and the Landscape of Digital Lending, Development of Alternative Finance, The Outlook for SME Financing, Ecosystem Funding Crowd Finance, Payment and Retail Business, Digitization of Financial Services, Benefits of Digitization in Retail Banking and Corporate Banking. Artificial Intelligence And Fintech: Introduction, Artificial Intelligence, How Vital is Artificial Intelligence?, AI and FinTech, Global Artificial Intelligence (AI) in FinTech Market Overview, Artificial Intelligence (AI) in FinTech Market Segmentation, AI			

Changing the Financial Services Industry, Artificial Intelligence (AI) in FinTech Market Opportunities, Applications of Artificial Intelligence in FinTech.	
Textbook 1: Chapter 3, 4	Number of Hours: 6
Module-4	
Machine Learning And Fintech: Introduction, Characteristics of Machine Learning, Need of Machine Learning, Significance of Machine Learning, Machine Learning in Finance, Functions of Machine Learning in Finance, Advantages of Machine Learning for Accounting and Finance, Use Cases of Machine Learning in Finance, Benefits of Machine Learning in FinTech. Robotic Process Automation (RPA) And Fintech: Introduction, RPA in Banking, RPA's Advantages in Banking and Finance, Financial Data Analytics, Data Science and Big Data in Finance, Big Data is Revolutionizing Finance, Big Data Challenges in Finance.	
Textbook 1: Chapter 5, 6	Number of Hours: 6
Module-5	
Blockchain: Introduction, What is Blockchain?, Blockchain Technology, its Potential, and Applications, Blockchain Technology is Revolutionising FinTech, Blockchain Technology in FinTech, Fintech Blockchain Use Cases, The Benefits of Blockchain in FinTech, Blockchain in Financial Services: Key Statistics, Implementation of BCT Solutions in Indian Banks, Benefit from Blockchain Technology (BCT) in Banking, Block Chain Technology in Indian Banking Sector, Challenges and Considerations, Outlook for the Future. Crypto Currencies: Introduction, Cryptocurrencies and Blockchain, Cryptocurrencies, Outline of Cryptocurrency, Major Types of Cryptocurrencies Used, How to Keep Cryptocurrencies Safe, Cryptocurrencies' Legal and Regulatory Implications, The Legal Position of Cryptocurrencies in India, Impact on Cryptocurrencies.	
Textbook 1: Chapter 8, 7	Number of Hours: 6
Course Outcomes : At the end of the course, the student will be able to: CO 6. Explain the fundamentals and ecosystem of FinTech. CO 7. Describe FinTech hubs, digital payment systems. CO 8. Explain digital lending and the applications of Artificial Intelligence. CO 9. Describe the role of Machine Learning, Robotic Process Automation (RPA) in financial services. CO 10. Explain the fundamentals of Blockchain technology and Application of Cryptocurrencies in the financial sector.	
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):	
Text books: 1. C. Vijai and V. Dheenadhayalan, FinTech, First Edition, Vijay Nicole Imprints Private Limited, 2024. ISBN-13: 978-8119243426.	

Reference books / Manuals:

1. Chandrahauns Chavan, Atul Patankar, Introduction to Fintech, 1st Edition, Pearson Education, 2024.
2. Sanjay Phadke, FINTECH FUTURE : The Digital DNA of Finance, 1st Edition, Atlantic Publishers and Distributors (P) Ltd, 2025.

Web links and Video Lectures (e-Resources):

- Introduction of Fintech:
<https://www.youtube.com/watch?v=jf25vt1Sg3A&list=PLFW6lRTa1g80SSjd5ygkA6knaAvht3zNp&index=51>
- Fintech – Indian Pespective: https://link.springer.com/chapter/10.1007/978-981-97-6242-2_2
- Fintech and AI: <https://www.ibm.com/think/topics/fintech>
- Fintech and RPA: <https://tecknexus.com/5g-network/the-role-of-robotic-process-automation-rpa-in-fintech-streamlining-operations-and-enhancing-efficiency/>
- Fintech and ML: <https://railsware.com/blog/fintech-machine-learning-all-you-need-to-know/>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Interactive Lectures
- Case Study-Based Learning
- Demonstration-Based Learning
- ICT-Enabled Teaching
- Group Discussions and Seminars
- Industry-Oriented Learning
- Flipped Classroom Approach

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks, i.e., 20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks, i.e., 18 marks**.

Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include **a maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.	FinTech Case Study and Technology Survey: Study and prepare a report on Indian FinTech innovations such as UPI, NPCI, Digital Rupee (CBDC), DigiLocker, Aadhaar-enabled Payment System (AePS), Account Aggregator Framework, FASTag, or BHIM, explaining their working, benefits, security features, and societal impact.	10
2.	FinTech Startup and Emerging Technology Presentation: Prepare and present a seminar on an Indian or global FinTech startup or an emerging technology such as Artificial Intelligence, Machine Learning, Blockchain, Digital Lending, Robo-advisory, or RegTech, highlighting its applications, opportunities, challenges, and future trends.	15

Rubrics for Learning Activity

Performance Indicators (CO/PO Mapping)	Superior	Good	Fair	Needs Improvement	Unacceptable
Understanding of FinTech Concepts and Technologies (C01, C02, C03, P01)	Demonstrates comprehensive understanding of the selected FinTech concept, technology, or startup with accurate interpretation.	Demonstrates good understanding with minor conceptual gaps.	Demonstrates satisfactory understanding with occasional inaccuracies.	Demonstrates limited understanding requiring guidance.	Demonstrates inadequate understanding of the topic.
Analysis of Applications, Benefits, Challenges, and Recent Trends (C02, C03, C04, C05, P02)	Critically explains applications, benefits, challenges, and recent developments using appropriate examples.	Explains the topic clearly with minor omissions.	Provides basic analysis with limited supporting examples.	Analysis lacks clarity and depth.	Unable to analyze or explain the topic satisfactorily.
Use of Authentic Information Sources (C02, C05, P04)	Effectively uses authentic and up-to-date sources such as RBI, NPCI, UIDAI, DigiLocker, MeitY, SEBI, or official industry reports with proper references.	Uses relevant authentic sources with minor deficiencies.	Uses a mix of authentic and general sources.	Relies mainly on non-authentic or incomplete sources.	No credible sources are used.
Documentation, Presentation, and Communication (C05, P010)	Report/presentation is well-organized, technically sound, professionally presented, and communicates ideas effectively.	Well-organized with minor presentation or communication issues.	Satisfactory presentation with acceptable documentation.	Poor organization, documentation, or communication.	Incomplete submission or ineffective communication.

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.	Prepare a technical report on Indian FinTech services by studying digital payment systems, NPCI initiatives, Digital Rupee (CBDC), DigiLocker, Aadhaar-enabled services, Account Aggregator framework, or other digital financial platforms.	10
2.	Prepare and deliver a presentation on a FinTech startup or an emerging FinTech technology (AI, ML, Blockchain, Digital Lending, RPA, etc.), including applications, advantages, challenges, and recent developments.	10
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.	Study recent developments in the Indian FinTech ecosystem by exploring official resources such as RBI, NPCI, UIDAI, DigiLocker, and leading FinTech companies. Prepare a concise report on selected technologies or services.	12

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

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DATA STRUCTURE USING C LAB		Scheme	2026
Course Code	1BBCAL206	Semester	II
Teaching Hours/Week (L:T:P)	1 : 0 : 2	CIE Marks	50
Total Hours of Pedagogy L:T:P:SLTW	14 : 0 : 28 : 18	SEE Marks	50
Credits	2	Total Marks	100
Examination type (SEE)	Practical	Exam Hours	3
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to: CO 1. Develop C programs using recursion, arrays, and fundamental programming constructs to solve computational problems. CO 2. Implement searching and sorting techniques for efficient data processing and retrieval. CO 3. Apply stack operations and linked list concepts to design and develop appropriate data structure solutions. CO 4. Analyze, design, and implement real-world applications using suitable data structures and algorithms. CO 5. Demonstrate problem-solving, debugging, testing, and documentation skills through laboratory experiments and open-ended activities			
Note: - The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100. - Both PART-A and PART-B are considered for CIE and SEE. - Students have answer 1(one) question from PART-A and 1(one) question from PART-B. - The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks. - The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks. - For Continuous Internal Evaluation (CIE) during the semester, classwork shall typically include open-ended questions from Part-B, along with other similar questions designed to enhance the students' skills.			
Recommended Platform for Execution of Programs: - Open Source Software IDE such as Code::Blocks, Visual Studio Code - Compiler: GCC (GNU Compiler Collection)			
PART – A			
FIXED SET OF EXPERIMENTS			
- Write a recursive C program to perform linear search on an array and report the position of a given element. - Write a program to implement binary search technique on an array.			

3. Write a program to implement selection sort technique on an array.
4. Write a program to implement and demonstrate the Insertion, Deletion, Traversing operations on an array.
5. Write a program to implement and demonstrate the Push, Pop, Peek and Display operations on a stack.
6. Write a program to implement and demonstrate Insertion at the beginning, Deletion from the beginning, and Traversal operations on a singly linked list.

PART – B OPEN ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Analyze and compare the execution efficiency of recursive and iterative approaches for solving mathematical and computational problems.
2. Design and develop a student record management system using arrays with suitable searching techniques for efficient record retrieval.
3. Develop an inventory management application using arrays and sorting techniques for organizing and processing data records.
4. Design and implement a menu-driven application utilizing array operations for dynamic data management and manipulation.
5. Develop a real-world application such as browser history management, undo-redo operations, or expression evaluation using stack data structures.
6. Design and implement a dynamic information management system using singly linked lists for insertion, deletion, searching, and traversal of records.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):

Text books:

1. Reema Thareja, Data Structures using C, 2nd Ed, Oxford press, 2014.

Reference books / Manuals:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2nd Ed, Universities Press, 2014.
2. Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

3. Gilberg & Forouzan, Data Structures: A Pseudo-code approach with C, 2nd Ed, Cengage Learning, 2014.

Web links and Video Lectures (e-Resources):

- Data Structures & Algorithms: <https://www.futureskillsprime.in/course/data-structures-algorithms>
- Arrays: https://www.w3schools.com/dsa/dsa_data_arrays.php
- Stack, Queue, LinkedList: <https://nptel.ac.in/courses/106102064>
- Trees: https://www.w3schools.com/dsa/dsa_theory_trees.php
- Graphs: https://www.w3schools.com/dsa/dsa_theory_graphs.php

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Demonstration of data structure operations through visualizations and simulation tools.
- Hands-on programming sessions using C language and integrated development environments.
- Problem-based learning through implementation of real-world applications.
- Algorithm design using flowcharts and pseudocode prior to coding.
- Peer learning and collaborative programming activities.
- Open-ended experiments promoting creativity and critical thinking.
- Code debugging, testing, and optimization exercises.
- Self-learning through online tutorials, MOOCs, NPTEL lectures, and coding platforms.
- Mini-project development using data structures and algorithms.
- Technical presentations and discussions on applications of data structures

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for **30 marks**. Total marks for the all report shall be scaled down to 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and Marks scored shall be scaled down to **20 marks**. Final average of marks for report and test shall be out of 50 marks.

For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

Rubrics for CIE – Continuous assessment:

Performance Indicator	Superior	Good	Fair	Needs Improvement	Unacceptable
Problem Analysis and Algorithm Design	Demonstrates excellent understanding of the problem and develops an efficient algorithm independently.	Demonstrates good understanding and develops a correct algorithm with minimal guidance.	Demonstrates partial understanding and develops an acceptable algorithm with assistance.	Requires significant guidance to understand the problem and formulate an algorithm.	Unable to understand the problem or develop an algorithm.
Program Development and Implementation	Program is completely correct, efficient, and executes successfully for all test cases.	Program is correct and executes successfully with minor issues.	Program executes with some logical or syntactical errors.	Program executes partially and requires substantial corrections.	Program does not execute or fails to meet requirements.
Application of Data Structure Concepts	Applies appropriate data structures and concepts effectively and	Applies concepts correctly with minimal	Applies concepts partially with moderate	Demonstrates limited application of concepts.	Unable to apply relevant concepts.

	independently.	guidance.	assistance.		
Debugging and Testing	Independently identifies, resolves errors, and validates outputs using multiple test cases.	Identifies and resolves most errors with limited assistance.	Performs basic debugging and testing with guidance.	Demonstrates limited debugging and testing skills.	Unable to debug or verify program outputs.
Documentation and Laboratory Record	Record is complete, well-organized, neat, and submitted on time.	Record is complete with minor deficiencies.	Record is reasonably maintained but lacks completeness.	Record is incomplete or poorly maintained.	Record is not maintained or not submitted.
Participation and Professional Conduct	Actively participates, collaborates, and demonstrates initiative throughout laboratory activities.	Participates regularly and follows laboratory instructions.	Participates satisfactorily in assigned activities.	Demonstrates limited participation and engagement.	Rarely participates and shows poor laboratory conduct.

Rubrics for SEE / CIE Test:

Performance Indicator	Superior	Good	Fair	Needs Improvement	Unacceptable
Problem Understanding and Requirement Analysis	Clearly understands the problem and identifies the most appropriate solution approach independently.	Understands the problem and develops a suitable solution with minimal guidance.	Demonstrates partial understanding of the problem requirements.	Requires significant assistance to understand the problem.	Unable to understand the problem requirements.
Algorithm Design and Logic Development	Develops a correct, efficient, and well-structured algorithm independently.	Develops a correct algorithm with minor deficiencies.	Develops a partially correct algorithm with moderate assistance.	Algorithm contains major logical errors.	Unable to develop a workable algorithm.
Program	Program is	Program	Program	Program	Program

Coding and Implementation	completely correct, efficient, and adheres to coding standards.	executes correctly with minor errors.	executes partially with noticeable errors.	contains significant errors and requires extensive corrections.	does not execute or is incomplete.
Application of Data Structure Concepts	Demonstrates excellent application of appropriate data structures and programming concepts.	Applies concepts correctly with minor guidance.	Applies concepts partially with moderate understanding.	Demonstrates limited understanding of concepts.	Unable to apply relevant concepts.
Output Verification and Result Analysis	Produces correct output for all test cases and effectively analyzes results.	Produces correct output for most test cases.	Produces partially correct output with limited analysis.	Output is incorrect for several test cases.	Unable to obtain or verify output.
Viva-Voce and Conceptual Understanding	Answers all questions accurately with strong conceptual clarity.	Answers most questions correctly with good understanding.	Demonstrates basic understanding of concepts.	Demonstrates limited conceptual understanding.	Unable to answer fundamental questions.

- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks, i.e., 20 marks.**
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks, i.e., 18 marks.**
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks.**

WEB TECHNOLOGY LAB		Scheme	2026
Course Code	1BBCAL207	Semester	II
Teaching Hours/Week (L:T:P)	1 : 0 : 2	CIE Marks	50
Total Hours of Pedagogy L:T:P:SLTW	14: 0 : 28 : 18	SEE Marks	50
Credits	02	Total Marks	100
Examination type (SEE)	Practical	Exam Hours	03
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to: CO 1. Design and develop structured web pages using HTML5 and CSS3 for effective presentation of information. CO 2. Develop interactive web applications using JavaScript for client-side programming, DOM manipulation, and form validation. CO 3. Develop web applications using XML and PHP for structured data representation, server-side processing, and session management. CO 4. Integrate HTML5, CSS3, JavaScript, XML, and PHP to develop dynamic and responsive web applications. CO 5. Test, debug, document, and demonstrate web applications using appropriate web development tools and programming practices.			
Note: - The laboratory syllabus consists of PART-A and PART-B. While PART-A has 6 conventional experiments, PART-B has 6 typical open-ended experiments. The maximum marks for the laboratory course are 100. - Both PART-A and PART-B are considered for CIE and SEE. - Students have answer 1(one) question from PART-A and 1(one) question from PART-B. - The questions set for SEE shall be from among the experiments under PART-A. It is evaluated for 70 marks out of the maximum 100 marks. - The open-ended question set for SEE shall be any other open-ended question and not selected from the experiments under PART-A. It shall be evaluated for 30 marks. - For Continuous Internal Evaluation (CIE) during the semester, classwork shall typically include open-ended questions from Part-B, along with other similar questions designed to enhance the students' skills.			
Recommended Platform for Execution of Programs - Editor: Visual Studio Code/Notepad++ - Browser: Google Chrome/Firefox - PHP: XAMPP/WAMP Server			
PART – A FIXED SET OF EXPERIMENTS			
Develop a personal resume website using HTML5 and CSS3 to present personal, educational, and professional information in a structured and visually appealing			

format.

2. Develop a college admission form using HTML5 form controls and CSS3 to collect student information with an attractive user interface.
3. Develop a JavaScript-based student grade calculator that computes total marks, percentage, grade, and result based on user input.
4. Develop a client-side form validation application using JavaScript to validate user inputs before form submission.
5. Create an XML document to store student information and develop a JavaScript application to parse and display the XML data in a web browser.
6. Develop a PHP application to generate a student marksheet by accepting student details and marks, calculating the total, percentage, grade, and displaying the result.

PART – B OPEN ENDED EXPERIMENTS

Open-ended experiments are a type of laboratory activity where the outcome is not predetermined and students are given the freedom to explore, design, and conduct the experiment based on the problem statements as per the concepts defined by the course coordinator. It encourages creativity, critical thinking, and inquiry-based learning.

1. Design and develop an online feedback system using HTML5, CSS3, and JavaScript with appropriate client-side validation.
2. Design and develop an XML document representing real-world data and create a web application to parse and display the XML contents using JavaScript.
3. Develop a web application demonstrating XML namespaces and structured XML documents for representing hierarchical information.
4. Develop a multi-page web application integrating HTML5, CSS3, JavaScript, XML, and PHP to collect, validate, process, and display user information.
5. Design and develop a responsive departmental or college website using HTML5, CSS3, JavaScript, and multimedia elements.
6. Design and develop an online event registration or tourism information website using HTML5, CSS3, JavaScript, and PHP with appropriate navigation, validation, and user interaction.

Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):**Text books:**

1. Robert W. Sebesta, Programming the World Wide Web, 8th Edition, Pearson, 2022.

Reference books / Manuals:

1. Paul J. Deitel, Harvey M. Deitel, and Abbey Deitel, Internet & World Wide Web: How to Program, 5th Edition, Pearson Education, 2022.
2. Randy Connolly and Ricardo Hoar, Fundamentals of Web Development, 3rd Edition, Pearson Education, 2022.

Web links and Video Lectures (e-Resources):

- HTML and CSS: https://www.youtube.com/watch?v=h_RftxdJTzs
- JavaScript: <https://www.w3schools.com/js/default.asp>
- PHP: <http://www.w3schools.com/php/>
- PHP Language Reference: <http://php.net/manual/en/langref.php>

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- Problem-Based Learning (PBL)
- Coding Demonstrations
- Peer Learning Activities
- ICT-Enabled Teaching
- Flipped Classroom
- Collaborative Programming
- Case-Based Learning
- Mini Project-Based Learning

Assessment Structure:

The assessment for each course is equally divided between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each component carrying **50% weightage** (i.e., 50 marks each).

The CIE marks awarded shall be based on the continuous evaluation of the laboratory report using a defined set of rubrics. Each experiment report can be evaluated for **30 marks**. Total marks for the all report shall be scaled down to 30 marks. The laboratory test (duration 03 hours) at the end of the last week of the semester /after completion of all the experiments (whichever is early) shall be conducted for 50 marks and Marks scored shall be scaled down to **20 marks**. Final average of marks for report and test shall be out of 50 marks.

For both CIE and SEE, the student is required to conduct one experiment each from both Part A and Part B.

Rubrics for CIE – Continuous assessment:

Performance Indicator (CO/PO Mapping)	Superior (5)	Good (4)	Fair (3)	Needs Improvement (2)	Unacceptable (1)
Web Page Design and User Interface Development (HTML5 & CSS3) (CO1, CO2 / PO1, PO3)	Develops well-structured, responsive, and visually appealing web pages using HTML5 and CSS3 with appropriate layouts and styling.	Develops well-organized web pages with minor design or formatting issues.	Develops functional web pages with acceptable layout and styling.	Develops partially functional web pages with poor organization or styling.	Unable to develop a functional web page.
Client-Side Programming using JavaScript and DOM (CO3, CO4 / PO2, PO3)	Implements JavaScript programs with correct logic, effective DOM manipulation, event handling, and client-side validation.	Implements most JavaScript functionalities correctly with minor errors.	Implements basic JavaScript features with acceptable functionality.	Implements limited functionality with significant logical or syntax errors.	Unable to implement JavaScript or DOM-based functionality.
Server-Side Programming and XML Integration (CO4, CO5 / PO2, PO3)	Successfully develops PHP applications with proper form handling, cookies/sessions, and XML integration where applicable.	Develops PHP/XML applications with minor implementation errors.	Develops basic PHP/XML applications with acceptable functionality.	Develops incomplete applications with major errors.	Unable to develop PHP/XML-based applications.
Program Testing and Debugging (CO3-CO5 / PO2, PO4)	Thoroughly tests the application, identifies errors systematically, and delivers an error-free solution.	Adequately tests the application and resolves most errors.	Performs basic testing with partial debugging.	Performs limited testing with unresolved errors.	Does not test or debug the application.
Demonstration, Documentation	Demonstrates the application confidently,	Demonstrates the application	Demonstrates the application	Provides incomplete demonstration	Unable to demonstrate the

ion and Viva-Voce (CO1-CO5 / P010)	explains implementation clearly, and maintains well-organized documentation.	well with adequate explanation and documentation.	with satisfactory explanation and basic documentation.	tion with limited understanding or documentation.	application or explain the implementation.
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Rubrics for SEE / CIE Test:

Performance Indicator (CO/PO Mapping)	Superior (5)	Good (4)	Fair (3)	Needs Improvement (2)	Unacceptable (1)
Understanding of HTML5, CSS3, JavaScript, XML, and PHP Concepts (CO1-CO5 / P01)	Demonstrates comprehensive understanding of concepts with accurate explanations and appropriate technical terminology.	Demonstrates good understanding with minor conceptual errors.	Demonstrates satisfactory understanding of fundamental concepts.	Demonstrates limited understanding with noticeable conceptual gaps.	Demonstrates little or no understanding of the concepts.
Application of Web Technologies (CO2-CO5 / P02, P03)	Correctly applies HTML5, CSS3, JavaScript, XML, and PHP concepts to solve web development problems.	Applies concepts correctly with minor errors.	Applies basic concepts with acceptable accuracy.	Applies concepts partially with significant errors.	Unable to apply concepts to solve problems.
Program Design and Code Development (CO3-CO5 / P02, P03)	Develops well-structured, efficient, and syntactically correct HTML/CSS/JavaScript/PHP code.	Develops logically correct code with minor syntax or logical errors.	Develops acceptable code with moderate errors.	Develops incomplete or poorly structured code.	Unable to develop a correct solution.
Problem Solving and Output Analysis (CO3-CO5 / P02, P04)	Accurately analyzes the given problem, predicts output, identifies errors, and justifies the solution.	Correctly analyzes most problems with minor inaccuracies.	Performs satisfactory analysis with partial correctness.	Demonstrates limited analytical ability with several errors.	Unable to analyze the problem or interpret the output.

Presentation and Technical Documentation (C01-C05 / PO10)	Presents solutions systematically using appropriate syntax, code formatting, diagrams, and technical terminology.	Presents solutions clearly with minor omissions.	Presents reasonably organized solutions with acceptable clarity.	Presents incomplete or poorly organized solutions.	Presents incorrect or unclear solutions with inadequate technical presentation.
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- To qualify and become eligible to appear for SEE, in the **CIE component**, a student must secure **a minimum of 40% of 50 marks, i.e., 20 marks.**
- To pass the **SEE component**, a student must secure **a minimum of 35% of 50 marks, i.e., 18 marks.**
- A student is deemed to have **successfully completed the course** if the **combined total of CIE and SEE is at least 40 out of 100 marks.**

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CONSTITUTION OF INDIA		SEMESTER	II
Course Code	1BBCA108	CIE Marks	50
Teaching Hours/Week (L: T/SDA: P)	0:2:0	SEE Marks	50
Total Hours of Pedagogy	12-15	Total Marks	100
Credits	1	Exam Hours	01
Type of the course	Theory (MCQ)		
COURSE OBJECTIVES: • Understand India’s socio-political culture and philosophical traditions. • Explore the significance and sacrifices of the freedom struggle. • Examine the Constitution’s values and the roles of constitutional offices. • Review the contributions of Gandhiji, Dr. B.R. Ambedkar, Nehru, and Tilak, and key values like tolerance and equality. • Assess the Constitution’s impact and the effectiveness of its institutions.			
MODULE-1			
BACKGROUND TO THE STUDY OF INDIAN CONSTITUTION Philosophical and Political foundations of India: Dharma and Danda, Buddhist, liberal (Raja Rammohun Roy) and Subaltern (Ranajit Guha)* Colonial impact on Indian society,** Nationalist perspective (Swamy Vivekananda and Sri Aurobindo). Political values and Ideals during freedom struggle: Non Violence, Tolerance, Satyagraha and Swadeshi (Gandhi), Swarajya (Tilak), Integral Humanism (Deen Dayal Upadhyay) and Voluntarism (Vinoba Bhave). Political Contribution of Regional freedom struggle: Kittur Rani Chennamma, Hardekar Manjappa, Madikeri Peasants, Halagali Bedas.			
MODULE-2			
CONSTITUTIONAL DEVELOPMENT AND ITS PHILOSOPHY Historical background of Constitutional development in India - Developments between 1857 to 1952 (only Acts during this period must be taught), Composition and debates of Constituent Assembly (in brief), working of committees.			

Philosophy and features of Indian Constitution – Preamble*, Salient features**, Constitutionalism, Dr B.R. Ambedkar and Nehru's contribution in the making of the Constitution.

Working of the Constitution - Fundamental Rights, Union-State and Inter-State Relations (Art. 263, Inter-State disputes and trade and commerce), important Amendments to the Constitution**, Parliamentary Committees* (Standing, Ad hoc and Departmental).

MODULE-3

CONSTITUTIONAL INSTITUTIONS AND CITIZEN'S ROLE

Parliamentary and Constitutional Institutions: Legislature (Upper and Lower house), Executive (composition and powers), Judiciary (High Court and Supreme Court, its composition and jurisdiction), Comptroller and Auditor General, Inter-State Council, Election Commission.

Role and Responsibilities of Citizens under Indian Constitution: Concept of Citizenship, Citizenship Amendment Act, Fundamental Duties, Right to Information Act, Civil Society.*

Goals and Policies of National Development enshrined in the Constitution: Concept of National Development, Unity and Integrity of the nation, Goals of Educational Policies, Role of teachers and students in Nation Building**.

Teaching Methodology: Chalk and talk method / PowerPoint Presentation.

COURSE OUTCOMES:

- CO 1.** Understand India's Evolution: Grasp India's socio-political and philosophical background.
- CO 2.** Freedom Struggle Impact: Describe the significance and sacrifices of the freedom struggle.
- CO 3.** Constitutional Insight: Know the Constitution's values and office roles.
- CO 4.** Key Figures' Contributions: Recognize the roles of Gandhiji, Dr. B.R. Ambedkar, Nehru, and Tilak.
- CO 5.** Evaluate Constitutional Effectiveness: Assess the Indian Constitution's impact and efficiency.

Suggested Learning Resources:

Books

1. Altekar A.S. 1949. "State and Government in Ancient India". Motilal Banarsidass Chowk, Banaras
2. Andre Beteille, 1965. Caste, class, and Power. Berkley: University of California Press.
3. Arora & Mukherji, Federalism in India, Origin and Developments, Vikas Publishing House, New Delhi, 1992.
4. Bhandarkar D.D. 1940. "Some Aspects of Ancient Indian culture". University of Madras.
- Chandra Bipan. 1979. "Nationalism and Colonialism in India". Orient, Lang.
5. Constitution of India (Full Text), India.gov.in., National Portal of India, https://www.India.gov.in/sites/upload_files/npi/files/coi_part_full.pdf
6. D. C. Gupta, Indian Government and Politics, Vikas publishing House, New Delhi, 1975.

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