Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur 440033

Scheme and Syllabus
B. Sc. in Applied Electronics & Software Technology

Submitted by
Board of Studies

B. Sc. in Applied Electronics & Software Technology

Bachelor of Science (Honors/Research)

(Applied Electronics & Software Technology - Major)
Four Year (Eight Semester Degree Course)
Teaching and Examination Scheme

B.Sc. Sem-I (Applied Electronics & Software Technology - Major)

SN	Course Category	Name of Course	Course Code	Teaching Scheme Hrs.			Total Credits	Examination Scheme							
								Theory				Practical		
				TH	TU	P		Exam Hrs	SEE	CIE	Min	SEE	CIE	Min
1	DSC	Computer Fundamentals	BET1T01	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Computer Fundamentals	BET1P01	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Electrical Engineering I	BET1T02	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Electrical Engineering I	BET1P02	-	-	2	1	-	-	-	-	-	50	25
5	GE/OE	Refer GE/OE Basket	BGO1T01	2	-	-	2	3	80	20	40	-	-	-
6	GE/OE	Refer GE/OE Basket	BGO1T02	2	-	-	2	3	80	20	40	-	-	-
7	VSC	Applied Physics I	BVS1P01	-	-	4	2	-	-	-	-	50	50	50
8	SEC	Refer SEC Basket	BVS1P02	-	-	4	2	-	-	-	-	50	50	50
9	AEC	Compulsory English	BAE1T01	2	-	-	2	3	50	50	40	-	-	
10	VEC	Environmental Science	BVE1T01	2	-	-	2	3	80	20	40	-	-	
11	IKS	Vedic Mathematics	BIK1T01	2	-	-	2	3	80	20	40	-	-	
12	CC	Refer CC Basket	BCC1P01	-	-	4	2	-	-	-	-	-	100	50
				14	-	20	**22**		**530**	**170**		**125**	**275**	

B.Sc. Sem-II (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme							
									Theory				Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Computer Programming	BET2T03	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Computer Programming	BET2P03	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Electrical Engineering II	BET2T04	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Electrical Engineering II	BET2P04	-	-	2	1	-	-	-	-	-	50	25
5	GE/OE	Refer GE/OE Basket	BGO2T03	2	-	-	2	3	80	20	40	-	-	-
6	GE/OE	Refer GE/OE Basket	BGO2T04	2	-	-	2	3	80	20	40	-	-	-
7	VSC	Applied Physics II	BVS2P03	-	-	4	2	-	-	-	-	50	50	50
10	SEC	Refer SEC Basket	BVS2P04	-	-	4	2	-	-	-	-	50	50	50
11	AEC	Second Language	BAE2T02	2	-	-	2	3	50	50	40	-	-	-
12	VEC	Constitution of India	BVE2T02	2	-	-	2	3	80	20	40	-	-	-
13	IKS	Indian Astronomy	BIK2T02	2	-	-	2	3	80	20	40	-	-	-
14	CC	Refer CC Basket	BCC2P02	-	-	4	2	-	-	-	-	-	100	50
	Total			14	-	16	**22**		**530**	**170**	-	**125**	**275**	

Exit option: Award of UG Certificate in Major with 40-44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor

B.Sc. Sem-III (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.) (Th)	TU	P	Total Credit	Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
									Theory			Practical		
1	DSC	Object Oriented Programming I	BET3T05	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Object Oriented Programming I	BET3P05	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Digital Electronics I	BET3T06	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Digital Electronics I	BET3P06	-	-	2	1	-	-	-	-	-	50	25
5	Minor	Minor 1 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
6	Minor	Minor 1 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
7	Minor	Minor 2 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
8	Minor	Minor 2 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
9	GE/OE	Refer GE/OEBasket	BGO3T05	2	-	-	2	3	80	20	40	-	-	-
10	VSC	Engineering Drawing	BVS3P05	-	-	4	2	-	-	-	-	50	50	50
11	AEC	Second Language	BAE3T03	2	-	-	2	3	50	50	40	-	-	-
12	FP	Field Project	BFP3P01	-	-	4	2	-	-	-	-	50	50	50
13	CC	Refer CC Basket	BCC3P03	-	-	4	2	-	-	-	-	-	100	50
	Total			12	-	20	**22**		450	150		150	350	

B.Sc. Sem-IV (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme							
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Object Oriented Programming II	BET4T07	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Object Oriented Programming II	BET4P07	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Digital Electronics II	BET4T08	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Digital Electronics II	BET4P08	-	-	2	1	-	-	-	-	-	50	25
5	Minor	Minor 3 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
6	Minor	Minor 3 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
7	Minor	Minor 4 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
8	Minor	Minor 4 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
9	GE/OE	Refer GE/OE Basket	BGO4T06	2	-	-	2	2	80	20	40	-	-	-
10	SEC	Refer SEC Basket	BVS4P06	-	-	4	2	-	-	-	-	50	50	50
11	AEC	English Compulsory	BAE4T03	2	-	-	2	3	50	50	40	-	-	-
12	CEP	Community Service	BCM4P01	-	-	4	2	-	-	-	-	50	50	50
13	CC	Refer CC Basket	BCC4P04	-	-	4	2	-	-	-	-	50	50	50
	Total			12	-	20	**22**		450	150		150	350	

Exit option; Award of UG Diploma in Major and Minor with 80-88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor

B.Sc. Sem-V (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme							
								Theory				Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Microprocessors	BET5T09	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Microprocessors	BET5P09	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Linear Integrated Circuits	BET5T10	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Linear Integrated Circuits	BET5P10	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Algorithm & Data Structure	BET5T11	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Algorithm & Data Structure	BET5P11	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 1 (Refer Elective DSE Basket)	BET5T12	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 1 (Refer Elective DSE Basket)	BET5P12	-	-	2	1	-	-	-	-	-	50	25
9	Minor	Minor 5 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
10	Minor	Minor 5 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
11	Minor	Minor 6 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
12	Minor	Minor 6 (Refer Minor Basket)		-	-	2	1	-	-	-	-	-	50	25
13	VSC	Simulation using LabView	BVS5P07	-	-	4	2	-	-	-	-	50	50	50
14	CEP	Community Service	BCM5P02	-	-	2	1	-	-	-	-	25	25	25
	Total			13	-	18	22	-	520	130	--	150	300	-

B.Sc. Sem-VI (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
				(Th)	TU	P		Theory				Practical		
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
-	DSC	Microprocessors	BET6T13	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Microprocessors	BET6P13	-	-	2	1	-	-	-	-	25	25	25
3	DSC	Linear Integrated Circuits	BET6T14	2	-	-	2	3	80	20	40	-	-	-
4	DSC	Linear Integrated Circuits	BET6P14	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Algorithm & Data Structure	BET6T15	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Algorithm & Data Structure	BET6P15	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 2 (Refer Elective Basket)	BET6T16	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 2 (Refer Elective Basket)	BET6P16	-	-	2	1	-	-	-	-		50	25
9	Minor	Minor 7 (Refer Minor Basket)		2	-	-	2	3	80	20	40	-	-	-
10	Minor	Minor 7 (Refer Minor Basket)		-	-	2	1	-	-	-	-	25	25	25
11	VSC	Simulation using MatLab	BVS6P08	-	-	4	2	-	-	-	-	50	50	50
12	OJT	Internship (Related toDSC)	BOJ6P01	-	-	8	4	-	-	-	-	100	100	100
Total				**11**	**-**	**22**	**22**		**440**	**110**		**225**	**325**	

Exit option: Award of UG Degree in Major with 120-132 credits OR Continue with Major and Minor

B.Sc. Sem-VII (Honors) (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
								Theory				Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Microcontrollers	BET7T17	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Microcontrollers	BET7P17	-	-	2	1	-	-	-	-	25	25	25
3	DSC	System Design I	BET7T18	2	-	-	2	3	80	20	40	-	-	-
4	DSC	System Design I	BET7P18	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Advanced Programming I	BET7T19	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Advanced Programming I	BET7P19	-	-	2	1	-	-	-	-	25	25	25
7	DSC	Circuit Design I	BET7T20	2	-	-	2	3	80	20	40	-	-	-
8	DSC	Circuit Design I	BET7P20	-	-	2	1	-	-	-	-	-	50	25
9	DSE	Elective 3	BET7T21	3	-	-	3	3	120	30	60	-	-	-
10	DSE	Elective 3	BET7P21	-	-	2	1	-	-	-	-	25	25	25
11	RM	Research Methodology	BET7T22	2	-	-	2	3	80	20	40	-	-	-
12	RM	Research Methodology	BET7P22	-	-	4	2	-	-	-	-	50	50	50
	Total			**13**	**-**	**14**	**20**		**520**	**130**		**125**	**225**	

B.Sc. Sem-VIII (Honors) (Applied Electronics & Software Technology - Major)

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
								Theory				Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Advanced Microcontrollers	BET8T23	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Advanced Microcontrollers	BET8P23	-	-	2	1	-	-	-	-	25	25	25
3	DSC	System Design II	BET8T24	2	-	-	2	3	80	20	40	-	-	-
4	DSC	System Design II	BET8P24	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Advanced Programming II	BET8T25	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Advanced Programming II	BET8P25	-	-	2	1	-	-	-	-	25	25	25
7	DSC	Circuit Design II	BET8T26	2	-	-	2	3	80	20	40	-	-	-
8	DSC	Circuit Design II	BET8P26	-	-	2	1	-	-	-	-	-	50	25
9	DSE	Elective 4	BET8T27	3	-	-	3	3	120	30	60	-	-	-
10	DSE	Elective 4	BET8P27	-	-	2	1	-	-	-	-	25	25	25
11	OJT	Apprenticeship (Related to DSC)	BOJ8P02	-	-	8	4	-	-	-	-	100	100	100
		Total		11	-	18	**20**		440	110		175	275	

Four Year UG Honours Degree in Major and Minor with 160-176 credits

B.Sc. Sem-VII (Research) (Applied Electronics & Software Technology - Major)

SN	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme							
									Theory				Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	DSC	Microcontrollers	BET7T17R	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Microcontrollers	BET7P17R	-	-	2	1	-	-	-	-	25	25	25
3	DSC	System Design I	BET7T18R	2	-	-	2	3	80	20	40	-	-	-
4	DSC	System Design I	BET7P18R	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Advanced Programming I	BET7T19R	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Advanced Programming I	BET7P19R	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 3	BET7T20R	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 3	BET7P20R	-	-	2	1	-	-	-	-	-	50	25
9	RM	Research Methodology	BET7T21R	2	-	-	2	3	80	20	40	-	-	-
10	RM	Research Methodology	BET7P21R	-	-	4	2	-	-	-	-	50	50	50
11	RP	Research Project/ Dissertation (Core)	BRP7P01	-	-	6	3	-	-	-	-	75	75	75
		Total		11	-	18	20		440	110		225	225	

'R' in the subject code indicates 'Research'.

B.Sc. Sem-VIII (Research) (Applied Electronics & Software Technology - Major)

SN	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
									Theory			Practical		
				(Th)	TU	P		Exam Hrs.	SEE	CIE	Min	SEE	CIE	Min
1	DSC	Advanced Microcontrollers	BET8T22R	2	-	-	2	3	80	20	40	-	-	-
2	DSC	Advanced Microcontrollers	BET8P22R	-	-	2	1	-	-	-	-	25	25	25
3	DSC	System Design II	BET8T23R	2	-	-	2	3	80	20	40	-	-	-
4	DSC	System Design II	BET8P23R	-	-	2	1	-	-	-	-	-	50	25
5	DSC	Advanced Programming II	BET8T24R	2	-	-	2	3	80	20	40	-	-	-
6	DSC	Advanced Programming II	BET8P24R	-	-	2	1	-	-	-	-	25	25	25
7	DSE	Elective 4	BET8T25R	3	-	-	3	3	120	30	60	-	-	-
8	DSE	Elective 4	BET8P25R	-	-	2	1	-	-	-	-	-	50	25
9	RP	Research Project / Dissertation (Core)	BRP8P02	-	-	14	7 (4+2+1)	-	-	-	-	175	175	175
		Total		09	-	22	20		360	90		225	325	

'R' in the subject code indicates 'Research'.

Four Year UG Honours with Research Degree in Major and Minor with 160-176 credits

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Total Credits : Four Year UG Degree Program : 172

Abbreviations: Generic/Open Electives: OE, Vocational Skills & Skill Enhancement Courses: VSEC, Vocational Skill Courses: VSC, Skill Enhancement Courses: SEC, Ability Enhancement Courses: AEC, Indian Knowledge Systems: IKS, Value Education Courses: VEC, On Job Training (Internship/Apprenticeship): OJT, Field Project: FP, Community Engagement & Service: CEP, Co-curricular Courses: CC, Research Methodology: RM, Research Project: RP

Basket for Minor Category Courses

B. Sc. (Applied Electronics and Software Technology)

Basket for ELECTIVE (DSE) Category Courses

Semester	Course Category	Name of Course	Course Code
V	Elective 1	A. Digital Signal Processing I B. Python Programming I	BET5T12
VI	Elective 2	A. Digital Signal Processing II B. Python Programming II	BET6T16
VII (Honors)	Elective 3	A. Artificial Intelligence B. Mobile Communication	BET7T21
VIII (Honors)	Elective 4	A. Computer Network B. Digital Communication	BET8T27
VII (Research)	Elective 3	A. Artificial Intelligence B. Mobile Communication	BET7T20R
VIII (Research)	Elective 4	A. Computer Network B. Digital Communication	BET8T25R

B. Sc. (Applied Electronics & Software Technology) (Honors/Research)

Four Year (Eight Semester Degree Course)

(Question Paper Pattern for all subjects)

Scheme for Theory Examination

Duration for each theory Examination: **3 Hours**

Maximum Marks Allotted to each Theory: **80**

Instruction for paper setting and distribution of Marks-

1) The Examiner shall set a question paper of 8 questions. The examiner has to set **Eight** questions on all units. Preferably **one** question on each unit and a **last question** based on all units together. Each question will be of 16 marks, internal equal division is suggested.

2) The moderation committee shall retain 7 questions.

3) The student should answer any 5 questions out of 7.

B. Sc (Applied Electronics & Software Technology) – Semester I (DSC)

BET1T01   COMPUTER FUNDAMENTALS

     Scheme of Examination (Theory)

SEE – 80
CIE - 20
Total - 100

Course Outcome : Students will be introduced to
- the computer technology
- various softwares
- hardware and
- learn programming language

Unit I :
Introduction, History of computers, Generation of computer.

Unit II :
Basic computer organization: input-output devices, Storage devices.

Unit III :
Relationship between hardware and software, System Software, Application Software

Unit IV :
Working with DOS, Basic DOS commands & advanced DOS commands.

Unit V : Flow chart

Reference Book : Computer Fundamentals – P.K.Sinha

BET1P01   COMPUTER FUNDAMENTALS

Scheme of Examination (Practical)

SEE – 25
CIE - 25
Total - 50

Minimum 5 practicals based on the theory syllabus

BET1T02   ELECTRICAL ENGINEERING I

Scheme of Examination (Theory)

SEE – 80
CIE - 20
Total - 100

Course Outcome : The students will
- gain knowledge of ac, dc circuits
- Laws governing these circuits
- Source conversion
- Knowledge of transformers, generator and motors

Unit I : Electric Circuits : Ohm's Law, Resistance in series, Resistances in parallel, Voltage source and current source (ideal and practical), Source Transformation

Unit II : Electric Circuits : Kirchoff's Current Law (KCL), Kirchoff's Voltage Law (KVL), Star-delta Transformation

Unit III: Magnetic Circuits: Magnetic field, Flux, Flux density, Magnetomotive force (mmf), Field intensity or magnetizing force, Magnetisation curve, Comparison of electric and magnetic circuits, Series and parallel magnetic circuits.

Unit IV : A.C. Circuits : Generation of single phase ac voltage and current, average and rms values, Form factor, Phasor representation of alternating quantity, Reactances and impedances,

Unit V : A.C. Circuits : A.C. through pure resistance, Inductance and capacitance, Power in ac circuit, Power factor, series and parallel as circuits, Resonance condition in series and parallel circuits.

Reference Books :
1. A Text book of Electrical Technology : Volume I & II – B.L. Theraja
2. Worked Examples in Electrical Engineering – B.L. Theraja

BET1P02   ELECTRICAL ENGINEERING I

Scheme of Examination (Practical)

CIE - 50
Total - 50

1. Verification of Kirchoff's Current Law.
2. Verification of Kirchoff's Voltage Law.
3. Verification of Superposition Theorem.
4. Study of B-H Curve.
5. Verification of various relations in R-L series circuit.

B. Sc (Applied Electronics & Software Technology) – Semester I (VSC)

BVS1P01   APPLIED PHYSICS I

Scheme of Examination (Practical)
SEE – 50
CIE - 50
Total - 100

1. Determination of the resistivity of a semiconductor
2. Determination of the band gap in a semiconductor using a p-n junction diode in reverse bias condition
3. A study of the characteristics of a thermistor
4. A study of single beam cathode ray oscilloscope (CRO)
5. A study of dual trace CRO:
     i)   Familiarization
     ii)   Determination of phase difference by direct method
     iii)   Determination of phase and frequency using Lissajous patterns.

Reference Books :
1. Material Science and Engineering : V. Raghavan
2. Physics for students of Science and Engineering Part II –David Haliday & Robert Resnick
3. Electronic Engineering material – John Allison (TMH)
4. Modern Physics – Sproul

B. Sc (Applied Electronics & Software Technology) – Semester I (AEC)

BAE1T01   COMPULSORY ENGLISH

Scheme of Examination (Theory)
SEE – 80
CIE - 20
Total - 100

COURSE OUTCOMES:
Students will be able to enhance their awareness of correct usage of English language in writing and speaking.

- Students will improve their speaking ability in English both in terms of fluency and comprehensibility.
- Students will enlarge their vocabulary.
- Students will review the grammatical forms of English and the appropriate use of these forms in specific communicative contexts.
- Students will develop their ability as critical readers and connect issues discussed in the text with life.
- Students will attain and enhance competence in the four modes: writing, speaking, reading & listening
- Students will develop skills that enable them to present their ideas clearly and logically to achieve a specific purpose.

Theory Exam: 50 Marks
Continuous Internal Evaluation (CIE): 50 Marks
Total: 100 Marks

Prescribed Text: Stepping Stone - Board of Editors
(Published by Macmillan Education India Pvt. Ltd.)

UNIT-1

1. Grassroots Innovation and Social Enterprise - Saji woe Oa
2. Two Gentlemen of Verona - A. J. Cronin
3. Go, Kiss the World - Subroto Bagchi

UNIT-2
4. Little Girls Wiser than Men - Leo Tolstoy
5. The Narmada
6. Old Manat the Bridge - Ernest Hemingway

UNIT-3 (LANGUAGE SKILLS-1)
➢ Greetings and Introduction
➢ Countries and Nationalities
➢ Interesting Products
➢ Activities and Interest
➢ Food
➢ My Family

UNIT-4 (LANGUAGE SKILLS-2)

➤ Preparing a Flyer for an Event, Preparing Advertisement for a Product, Preparing a Handout for a Social Cause/ Issue
➤ Resume Writing

Continuous Internal Evaluation (CIE): 50 Marks
A Continuous Internal Assessment of 50 marks shall be based on the different oral communication skills activities regularly conducted by the Teacher and the worksheets/ written assignments /creative projects to be submitted by the students. The students are required to actively participate in these activities and mandatorily submit the worksheets/written assignments/creative projects. The guidelines and some suggested items for the activities/assignments are given in the prescribed Text Book, 'Stepping Stone'.

QUESTION PAPER PATTERN
THEORY EXAM
(50 MARKS)

Q.1 Answer any Two (Out of Three) of the given questions in about 50 words each.
(UNIT-1)   (2 X 5 Marks = 10)

Q.2 Answer any Two (Out of Three) of the given questions in about 50 words each.
(UNIT-2)   (2 X 5 Marks = 10)

Q.3 (A) Five Very Short Answer Questions to be answered in one or two sentences each
(UNIT-1)   (5 X 1 Mark = 5)

(B) Five Very Short Answer Questions to be answered in one or two sentences each
(UNIT-2)   (5 X 1 Mark = 5)

Q.4 Writing a script of the dialogue of any ONE (Out of Two) of the conversational situations. (UNIT-3)   (1 X 10 Marks = 10)

Q.5 Attempt any ONE (Out of Two) of the Questions based on the items prescribed in UNIT-4   (1 X 10 Marks = 10)

BVE1T01   ENVIRONMENTAL SCIENCE

Scheme of Examination (Theory)
SEE – 80
CIE - 20
Total - 100

COURSE OUTCOMES:

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

- Explain the basics of Environmental Science and Atmospheric Science along-with the components of Environment
- Explicate the importance of Environmental Education.
- Elucidate the fundamentals of atmospheric science including formation, depletion and effects of ozone layer and acid rain on environment.
- Describe the various physical and chemical characteristics and properties of Water and Soil
- Understand the Ecology and its allied branches
- Comprehend about Population and Community Ecology
- Study the changes in Population by understanding the concept of Population ecology

Unit-I: Basics of Environmental Science (7.5 Hrs)

A.   Introduction of Environmental Science: Definition, Types, Classification, Characteristics, Components and principles of environment. Scope and need for environmental science, Multidisciplinary nature of environmental science, Environmental ethics.
B.   Environmental Education: Goals, Objectives and principles of environmental education, formal and non-formal environmental education, environmental programme, importance of environmental education, environmental awareness.
C.   Components of Environment: Atmosphere (Structure and composition),hydrosphere – distribution of water, hydrological cycle, global water balance, lithosphere – Internal structure of Earth, types of rocks, Biosphere- Boundaries of biosphere.

Unit-II: Basics of Atmospheric Science (7.5 Hrs)

A.   Atmospheric Chemistry: Structure of atmosphere based on temperature, photochemical reaction in the atmosphere, temperature inversion and lapse rate, smog formation, types of smog (sulphur and photochemical smog), adverse effect of smog on human being, aerosol.
B.   Green House Effect: Greenhouse gases, relative contribution and effects of greenhouse effect, control of greenhouse gases. Ozone depletion: chemistry of ozone depletion, Dobson Unit, ozone depleting substances (ODS), ozone hole, consequences of ozone depletion, mitigation measures and international protocols.
C.   Acid Rain: Chemistry of Acid Rain, effect of acid rain on ecosystem, control measures. Precipitation – Forms of precipitation (rain, drizzle, snow, sleet, and hail), types of precipitation (conventional, orographic, and cyclonic).

Unit-III: Basics of Ecology (7.5 Hrs)

- A. Ecology: Definition, subdivision and modern branches of ecology, ecology spectrum, scope of ecology. Application and significance of ecology to human beings.
- B. Abiotic Factors: Temperature: effect of temperature on plants and animals, Adaptation to meet

extreme temperature. Light: Zonation in marine habitat, effects of light on plants and animals, Microclimate and fire, Shelford law of tolerance, Leibigs law of minimum.

C. Biotic Factor: Inter specific relationship Positive: Mutualism (symbiosis), commensalism, proto-cooperation Negative: Parasitism, predation, competition, Antibiosis, Neutralism.

Unit-IV: Ecosystems and food chain (7.5 Hrs)

A. Ecosystem: Definition, structure and function of ecosystem, types of ecosystem: Terrestrial (forest, grassland, desert, cropland), Aquatic (Marine and freshwater)

B. Food chain: Definition & types: Grazing food chain, detritus food chain, and parasitic food chain, food web in forest and grassland ecosystem. Ecological pyramids (number biomass and energy), energy flow in ecosystem (Y- shaped). Energy flow and the law of thermodynamics.

C. Biogeochemical Cycles: Definition, classification, gaseous cycle (oxygen, carbon and nitrogen) Sedimentary cycle (phosphorus and sulphur).

Reference Books:
1. Text Book of Environment: K M Agrawal, P.K. Sikdar, and S.C. Deb, Mc'Millan Publication, Mumbai.
2. Man and Environment: M.C. Dash and P.C. Mishra, Mc'Millan Publication, Mumbai.
3. Environmental Science: S.C. Santra, New Central Book Pvt.Ltd, Kolkatta.
4. Environmental Problems and Solution: D.K. Asthana, S.Chand Publication, New Delhi.
5. Environmental Chemistry: S.S. Dara, S.Chand Publication ,New Delhi.
6. Environmental Chemistry: A.K. Dey, New Age International Publishers,2001.
7. A Textbook of Environmental Studies: Dr S.Satyanarayan, Dr S.Zade, Dr S Sitre and Dr P.U. Meshram, Allied Publishers, New Delhi.
8. Environmental Biology: Biswarup Mukherjee, Tata McGraw-Hill Publishing Company Ltd, New Delhi,1996.
9. Animal Ecology and Distribution of Animals: Veer Bala Rastogi, Rastogi Publication, Meerut (U.P).
10. Ecology and Environment: P.D.Sharma, Rastogi Publication ,Meerut (U.P).
11. Fundamentals of Environmental Biology: S. Arora, Kalyani Publishers.
12. Environmental Biology: P.K.G. Nair, Himalaya Publication.
13. Environmental Biology: K.C. Agrawal, Agro Botanical Publisher, Bikaner,1994

B. Sc (Applied Electronics & Software Technology) – Semester I (IKS)

Indian Knowledge System (IKS)
BIK1T01   VEDIC MATHEMATICS

Scheme of Examination (Theory)
SEE – 80
CIE - 20
Total - 100

Course Outcomes: This course will enable the students to
1. Improve speed and accuracy in numerical calculations
2. Acquire IQ skills and high-end technical knowledge
3. gain test taking skills & creativity of calculations

UNITS	TOPICS	HOURS
Unit 1	• Addition - Subtraction - Combined operations – Beejank • Multiplication methods: Urdhwatiryagbhayam, Nikhilam, Ekanyunen, Ekadhiken, Antyayordashakepi. • Vinculum - Operations. • Awareness of 1 to 5 Vedic sutras as per Shankaracharya Bharthikrishan Teerthji Swamiji's book.	8
Unit 2	• Division methods : Nikhilam, Paravartya Yojayet,Dhwajank • GCD and LCM • Expression of GCD in terms of two numbers.	8
Unit 3	• Divisibility tests, Osculation & Reverse osculation. • Division Algorithm, Quotient & Remainder. • Duplex method.	7
Unit 4	• Squares & Square-roots for 6 digit number. • Cubes & Cube-roots for 6 digit number, • Contribution of Indian Mathematicians in Arithmetic.	7
	TOTAL	**30 HRS**

Reference Books:

1. Tirthaji B.K. (1965) Vedic Mathematics, MotilalBanarsidass
2. Bidder G.P. (1856) On Mental Calculation. Minutes of Proceedings, Institution ofCivil Engineers (1855-56), 15, 251-280
3. Scripture E.W. (1891) American Journal of Psychology. Vol. IV 1-59
4. Mitchell F.D. (1907) American Journal of Psychology. Vol. XVIII 61-143
5. Aitken A.C. (1954) The Art of Mental Calculation: With Demonstrations. Transactions of the Society of Engineers. 45, 295-309
6. Dow A. (1991) A Unified Approach to Developing Intuition in Mathematics, Scientific Research on the Transcendental Meditation and TM-Sidhi Program Vol 5,3386-3398
7. Williams K.R. (1984) Discover Vedic Mathematics. Vedic Mathematics Research Group
8. Nicholas, Williams, Pickles (1984) Vertically and Crosswise. Inspiration Books

SYLLABUS

B. Sc (Applied Electronics & Software Technology) – Semester II (DSC)

BET2T03   **COMPUTER PROGRAMMING**

Scheme of Examination (Theory)
SEE – 80
CIE - 20
Total - 100

Course Outcome : Students will learn
- Constants, variables in C
- Various loops
- Functions
- learn programming language

Unit I :
Constants, Variables and keywords, Their types, rules to form keywords, constants and variable names , range of various types of constants. Hierarchy of various C operations.
Unit II
Control structure – 'if statement', 'if-else' statement, logical operators and conditional operators, relational operators
Unit III
Loop control structure : 'while', 'for loop', 'do-while' loop, break, continues statement.

Unit IV :
Functions : What is functions, Passing values between function, slope rule of functions, Function declaration and prototypes, Call by value, Call by reference, Recursion. Data types.
Unit V : Arrays
What are arrays, pointers and arrays, 2-dimensional arrays, Pointers and 2-dimensional arrays, Array of pointers, What are strings, Standard library string function, Array of pointers to strings structure.

Reference Books :

1. Computer Fundamentals –   P.K. Sinha
2. Let us C   -   Yashwant Kanetkar
3. Exploring C   -   Yashwant Kanetkar
4. Programming in C   -   E.Balguruswamy

BET2P03   **COMPUTER PROGRAMMING**

SEE – 25
CIE - 25
Total - 50

Minimum 10 programs based on syllabus

BET2T04   ELECTRICAL ENGINEERING   II

Scheme of Examination (Theory)

SEE – 80
CIE - 20
Total - 100

Course Outcome : The students will
- Know types of transformers
- Different types of motors and generators
- functioning and applications of motors

Unit I : Single Phase Transformer
Introduction, Basic principle, Construction, Classification, EMF equation, Transformer on no-load and on load, Phasor diagram
Unit II : Single Phase Transformer
Equivalent circuit, Losses, Efficiency, Regulation, Open circuit test and short circuit test.
Unit III : DC Generator
Construction, Principles of operation, Classification, Emf equation, Losses and efficiency, Power stage diagram.
Unit IV : DC Motor
Construction, Principle of operation, Back emf, Voltage equation, Speed equation, Losses, Power stage diagram, Different types of motors.
Unit V : Single Phase Induction Motor
Construction, Principle of operation, Double field revolving theory, Types of single phase induction motor, split phase type, Capacitor start induction run & Capacitor start and run type.

Reference Books :
3. A Text book of Electrical Technology : Volume I & II – B.L. Theraja
4. Worked Examples in Electrical Engineering – B.L. Theraja

BET2P04   ELECTRICAL ENGINEERING   II

Scheme of Examination (Practical)

CIE - 50
Total - 50

1. Verification of various relations in R-C series circuit.
2. Verification of various relations in R-L-C series circuit.
3. Verification of various relations in R-L-C parallel circuit.
4. Study of single phase transformer
5. To open perform open circuit and short circuit test on single phase transformer.

B. Sc (Applied Electronics & Software Technology) – Semester II (VSC)

BVS2P03   APPLIED PHYSICS II

Scheme of Examination (Practical)
SEE – 50
CIE - 50
Total - 100

1. Study of the characteristics of germanium and silicon diodes and their comparison.
2. Study of the characteristics and verification of the stability action of zener diode.
3. Study of the input, output and transfer characteristics of a pnp-npn transistor in common base configuration.
4. Study of the input, output and transfer characteristics of a pnp/npn transistor in common emitter configuration.
5. Study of series and parallel combination laws for resistance and capacitance

Reference Books :
5. Material Science and Engineering : V. Raghavan
6. Physics for students of Science and Engineering Part II –David Haliday & Robert Resnick
7. Electronic Engineering material – John Allison (TMH)
8. Modern Physics – Sproul

B. Sc (Applied Electronics & Software Technology) – Semester II (VEC)

BVE2T02   CONSTITUTION OF INDIA

Scheme of Examination (Theory)

SEE – 80

CIE - 20

Total - 100

UNIT – I:

- Historical Background to the Framing of the Indian Constitution: General Idea about the Constituent Assembly of India.

UNIT – II

- Preamble – Nature and key concepts/Constitutional values, Socialism, Secularism, Democracy, Justice, Liberty, Equality and Fraternity
- Salient Features of the Constitution of India

UNIT – III
- General study about the kinds, nature and importance of; Fundamental Rights, Directive Principles of State Policy and Fundamental Duties.

UNIT –IV

- Introduction of the Constitutional Institutions and Authorities;
- Central Legislature and Executive (Parliament of India, President of India and Council of Ministers)
- State Legislature and Executive (State legislative Assemblies, Governors and Council of Ministers)
- Higher Judiciary (Supreme Court of India and High Courts)

B. Sc (Applied Electronics & Software Technology) – Semester II (IKS)

BIK2T02   Indian Knowledge System (IKS)

INDIAN ASTRONOMY

Scheme of Examination (Theory)
SEE – 80
CIE - 20
Total - 100

Course Outcomes: This course will enable the students to understand that
1. It is possible to create a map of the intellectual growth of a culture using astronomy as a probe.
2. The growth of Indian astronomy occurs in distinct stages analogous to phase transitions of the evolution of cultures
3. Indian Astronomy therefore provides an excellent window to the past dramatic transitions.

UNITS	TOPICS	HOURS
Unit 1	Astronomy in Prehistoric Era, Astronomy in Vedic Era, Vedang Jyotish, Astronomical References In Religious Scriptures, Astronomies of the West	8
Unit 2	Arya Bhatta, Panch Siddhantika of Varahamihira, Surya Siddhanta Varahamihira to Bhaskar Acharya-II, Siddhant Shiromani of Bhaskar Acharya-II, Bhaskar Acharya-II to Jai Singh, Jai Singh and his Observatories.	8
Unit 3	After Jai Singh, Interaction with the Astronomies of the World, Modern Era Astronomy, Our Universe, Cosmology	7
Unit 4	Panchang Horoscope and Astrology, Siddhantas, Karnas and Koshtakas, Observational Instruments of Indian Astronomy	7
	TOTAL	**30 HRS**

Reference Books:
1. The Story of Astronomy In India, Chander Mohan, Pothi.com
2. Indian Astronomy: An Introduction. Front Cover S. Balachandra Rao. Universities Press, 2000
3. Astronomy in India: A Historical Perspective, Thanu Padmanabhan, Springer Science & Business Media
4. Hindu Astronomy, W. Brennand, Alpha Editions
5. Origin and Growth of Astronomy in India, https://www.tifr.res.in/~archaeo/FOP/FOP%20pdf%20of%20ppt/Vahia%20Origin%20of%20Astronomy.pdf