UG 2ND SEMESTER IST(HONOURS)

SEMESTER- II

Courses for Honours Students

Sem.	Course	Course Code	Title	Credits	Full Marks	Remarks
II	Core	C-3	Electronics Circuit	6	100	Compulsory
		C-4	Data Structure using C	6	100	
	Generic Elective	GE-2	Mathematics II	6	100	Numerical Methods
	Ability Enhancement	AECC-2	MIL (Odia/Hindi/Alt. English)	4	100	Compulsory

Core Course

C-3 - Electronics Circuit (6 Credits)

Full Marks: 100 [Mid Term: 15 Marks + End Term (Theory: 60 Marks + Practical: 25 Marks)]

THEORY

Unit- I

Diode Circuits: Ideal diode, piecewise linear equivalent circuit, dc load line analysis, Quiescent (Q) point. Rectifiers: HWR, FWR (center tapped and bridge). Circuit diagrams, working and waveforms, ripple factor & efficiency, comparison. Zener diode regulator circuit diagram, disadvantages of Zener diode regulator.

Bipolar Junction Transistor: Operation and types of BJT, Review of CE, CB Characteristics and regions of operation. DC load line, operating point, thermal runaway,

Unit- II

Transistor biasing: Fixed bias without and with RE, collector to base bias, voltage divider bias and emitter bias (+VCC and –VEE bias), circuit diagrams and their working. Transistor as a switch and as an Amplifier.

Power Amplifiers: Difference between voltage and power amplifier, classification of power amplifiers, Class A, Class B, their comparisons.

Operation of a Class A single ended power amplifier. Operation of Transformer coupled Class A power amplifier, overall efficiency. Circuit operation of complementary symmetry Class B push pull power amplifier, crossover distortion.

Unit- III

Feedback Amplifiers: Concept of feedback, negative and positive feedback, advantages and disadvantages of negative feedback, voltage (series and shunt), current (series and shunt) feedback amplifiers, gain, input and output impedances. Barkhausen criteria for oscillations, Study of phase shift oscillator, Colpitts oscillator and Hartley oscillator.

Unit- IV

Operational Amplifier: Introduction, Operational Overview, op-amp Supply Voltage, IC Identification, op-amp Packages, op-amp Parameters, op-amp as Voltage Amplifier, Inverting Amplifier, Non-inverting Amplifier, Voltage Follower, Summing Amplifier, Differential Amplifier, op-amp Applications: Comparators, Integrator, Differentiator.

Text Books:

1. Electronic Devices and Circuit Theory, Robert Boylstead and Louis Nashelsky, 9th Edition, 2013, PHI
2. Electronic Devices, David A Bell, Reston Publishing Company
3. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001)

PRACTICALS

1. Study of the half wave rectifier with filter circuit.
2. Study of the full wave rectifier with filter circuit.
3. Study the V-I characteristics of P-n junction diode.
4. Study of power supply using C filter and Zener diode.
5. Study of clipping and clamping circuits.
6. Study of CB Transistor Amplifier.
7. Study of CE Transistor Amplifier.
8. Study of Voltage divider configuration for transistors.
9. Study of the frequency response of R-C coupled amplifier and Tuned amplifier.
10. Designing of an amplifier of given gain for an inverting and non-inverting configuration using an op-amp.
11. Designing of an integrator using op-amp for a given specification
12. Designing of a differentiator using op-amp for a given specification.

C-4 - Data Structure using C (6 Credits)

Full Marks: 100 [Mid Term: 15 Marks + End Term (Theory: 60 Marks + Practical: 25 Marks)]

THEORY

Unit-1

Introduction: Basic Terminology, Data structure, Time and Space complexity, Review of Array, Structures, Pointers.

Linked Lists: Dynamic memory allocation, representation, Linked list insertion and deletion, Searching, Traversing in a list, double linked list, Sparse matrices.

Unit-2

Stack: Definition, Representation, Stack operations, Applications (Infix–Prefix–Postfix Conversion & Evaluation, Recursion).

Queues: Definition, Representation, Types of queue, Queue operations, Applications.

Unit-3

Trees: Tree Terminologies, General Tree, Binary Tree, Representations, Traversing, BST, Operations on BST, Heap tree, AVL Search Trees, M-way search tree, Applications of all trees.

Unit-4

Sorting: Exchange sorts, Selection Sort, Bubble sort, Insertion Sorts, Merge Sort, Quick Sort, Radix Sort, Heap sort.

Searching: Linear search, Binary search.

Text Books:

1. Classic Data Structure , D. Samanta , PHI , 2/ed.

Reference Books:

1. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Data Structures”, Galgotia Publications, 2000.
2. Sastry C.V., Nayak R, Ch. Rajaramesh, Data Structure & Algorithms, I. K. International Publishing House Pvt. Ltd, New Delhi.

CORE – 4 PRACTICAL/TUTORIAL: Data Structure Lab

Write a C Program for the followings

1. To insert and delete elements from appropriate position in an array.
2. To search an element and print the total time of occurrence in the array.
3. To delete all occurrence of an element in an array.
4. Array implementation of Stack.
5. Array implementation of Linear Queue.
6. Array implementation of Circular Queue.
7. To implement linear linked list and perform different operation such as node insert and delete, search of an item, reverse the list.
8. To implement circular linked list and perform different operation such as node insert and delete.
9. To implement double linked list and perform different operation such as node insert and delete.
10. Linked list implementation of Stack.
11. Linked list implementation of Queue.
12. Polynomial representation using linked list.
13. To implement a Binary Search Tree.
14. To represent a Sparse Matrix.
15. To perform binary search operation.
16. To perform Bubble sort.
17. To perform Selection sort.
18. To perform Insertion sort.
19. To perform Quick sort.
20. To perform Merge sort.

GE-2 – Mathematics II (6 Credits)

Full Marks: 100 [Mid Term: 15 Marks + End Term (Theory: 60 Marks + Practical: 25 Marks)]

THEORY

Unit-1

Floating point representation and computer arithmetic, Significant digits, Errors: Round-off error, Local truncation error, Global truncation error, Order of a method, Convergence and terminal conditions, Efficient computations.

Unit-2

Bisection method, Secant method, Regula−Falsi method Newton−Raphson method, Newton's method for solving nonlinear systems.

Unit-3

Interpolation: Lagrange's form and Newton's form Finite difference operators, Gregory Newton forward and backward differences Interpolation Piecewise polynomial interpolation: Linear interpolation.

Unit-4

Numerical integration: Trapezoid rule, Simpson's rule (only method), Newton−Cotes formulas, Gaussian quadrature, Ordinary differential equation: Euler's method Modified, Euler's methods, Runge-Kutta second methods

Text books

1. S.S. Sastry, "Introductory Methods of Numerical Analysis", EEE, 5/ed.
2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, 6/e (2012)

Reference books

1. Numerical Analysis: J. K. Mantri & S. Prahan, Laxmi Publication.
2. Introduction to Numerical Analysis, Josef Stoer and Roland Bulirsch, Springer.

PRACTICALS

(1) Bisection Method.
(2) Newton Raphson Method.
(3) Secant Method.
(4) Regula-Falsi Method.
(5) LU Decomposition Method.
(6) Gauss-Jacobi Method.
(7) Gauss-Siedel Method.
(8) Lagrange Interpolation (9) Newton Interpolation.
(10) Trapezoidal Rule
(11) Simpson's $1/3^{rd}$ Rule and
(12) Simpson's $3/8^{th}$ Rule

AECC-2 M.I.L (ODIA/ALT. ENGLISH/HINDI) (4 Credits)
Full Marks: 100 [Mid Term: 20 Marks + End Term: 80 Marks]

ସବିଶେଷ ପାଠ୍ୟ

ଯୋଗାଯୋଗମୂଳକ ମାତୃଭାଷା – ଓଡ଼ିଆ (AECC)

ପାଠ୍ୟ- ୧ / Course – 1: ଯୋଗାଯୋଗ ଅନୁବିଧି, ରୀତି ଓ ମାଧ୍ୟମ

୧ମ ଏକକ : ଯୋଗାଯୋଗର ପରିଭାଷା, ଅନୁବିଧି, ପରିସର ଓ ପ୍ରକାରଭେଦ

୨ୟ ଏକକ : ସାକ୍ଷାତକାର, ଭାଷଣ କଳା

୩ୟ ଏକକ : ସମ୍ବାଦର ପରିଭାଷା, ପରିସର ଓ ସମ୍ବାଦ ପ୍ରସ୍ତୁତି

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ବର୍ଣ୍ଣମାଳା, ବର୍ଣ୍ଣାଶୁଦ୍ଧିର ନିରାକରଣ । (ବନାନ ତ୍ରୁଟି - ସାଦୃଶ୍ୟଜନିତ ଅଶୁଦ୍ଧି, ଲିଙ୍ଗଗତ ଅଶୁଦ୍ଧି, ସନ୍ଧିଗତ ଅଶୁଦ୍ଧି, ସମାସଗତ ଅଶୁଦ୍ଧି, ବଚନ ଓ ବିଭକ୍ତିଗତ ଅଶୁଦ୍ଧି, ବାକ୍ୟ ବିଧିଜନିତ ଅଶୁଦ୍ଧି, ସମାର୍ଥବୋଧକ ଶବ୍ଦାଶୁଦ୍ଧି, ପ୍ରତ୍ୟୟ ଜନିତ ଅଶୁଦ୍ଧି, ଶବ୍ଦ ସଂଯୋଗାତ୍ମକ ଓ ସ୍ୱରସଙ୍ଗତି ଜନିତ ଅଶୁଦ୍ଧି)

ସହାୟକ ଗ୍ରନ୍ଥସୂଚୀ (ପାଠ୍ୟ- ୧ / Course – 1)

୧. ଯୋଗାଯୋଗ ମୂଳକ ମାତୃଭାଷା (ଓଡ଼ିଆ) ସାମଲ ବିରଞ୍ଚି ନାରାୟଣ, ସତ୍ୟନାରାୟଣ ବୁକ ଷ୍ଟୋର, କଟକ ।

୨. ସଂଯୋଗ ଅନୁବିଧି, ସନ୍ତୋଷ କୁମାର ତ୍ରିପାଠୀ, ନାଳନ୍ଦା, କଟକ

୩. ଭାଷଣ କଳା ଓ ଅନ୍ୟାନ୍ୟ ପ୍ରସଙ୍ଗ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷ୍ଟୋର,କଟକ

୪. ପ୍ରାୟୋଗିକ ଓଡ଼ିଆ ଭାଷା – ଓଡ଼ିଶା ରାଜ୍ୟପାଠ୍ୟ ପୁସ୍ତକ ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୫. ସମ୍ବାଦ ଓ ସାମ୍ବାଦିକତା – ଚନ୍ଦ୍ରଶେଖର ମହାପାତ୍ର, ଓଡ଼ିଶା ରାଜ୍ୟ ପାଠ୍ୟପୁସ୍ତକ ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର

୬. ନିର୍ଭୁଲ ଲେଖାର ମୂଳସୂତ୍ର, ନୀଳାମ୍ବିଭୂଷଣ ହରିଚନ୍ଦନ, ପି.ସି.ଆର ପବ୍ଲିକେସନ, ଭୁବନେଶ୍ୱର

୭. ସର୍ବସାର ବ୍ୟାକରଣ - ନାରାୟଣ ମହାପାତ୍ର ଓ ଶ୍ରୀଧର ଦାସ, ନିୟୁ ଷ୍ଟୁଡେଣ୍ଟସ୍ ଷ୍ଟୋର, କଟକ

AECC : HINDI (MIL)

UNIT - I
कविता

(i) कबीर - साखी : 1 से 10
(ii) तुलसी - विनयपत्रिका - पद 1 और 2
(iii) प्रसाद - मधुमय देश
(iv) निराला - भिक्षुक
(v) अज्ञेय - हिरोशिमा

UNIT - II
गद्य

(i) रामचन्द्र शुक्ल - उत्साह
(ii) हजारी प्रसाद द्विवेदी - कुटज
(iii) हरिशंकर परसाई - सदाचार का तावीज

UNIT - III
शब्द ज्ञान

(i) शब्द शुद्धि
(ii) वाक्य शुद्धि
(iii) पर्यायवाची शब्द
(iv) विलोम शब्द

UNIT - IV
सामान्य ज्ञान

(i) निबंध लेखन (Essay Writing)

MIL (ALTERNATIVE ENGLISH)

Introduction:

The paper is focused upon developing one fundamental skills of Language learning; reading which needs a thorough rethink and revision. In order to build a strong base for acquisition of the communication skills, suitable reading content is selected from diverse areas in prose form. This would boost the learner's competence in expressive and comprehension skills. The well researched language exercises in the form of usage, vocabulary and grammar is the other area that should attract the teacher and learner to work out for giving decent shape to the mastery of English language.

UNIT 1: Short Story

(i) Jim Corbett-The Fight between Leopards
(ii) Dash Benhur- The Bicycle
(iii) Dinanath Pathy- George V High School
(iv) Alexander Baron- The Man who knew too much
(v) Will f Jenkins- Uneasy Homecoming

UNIT 2: Prose

(i) Mahatma Gandhi- The way to Equal Distribution
(ii) S Radhakrishnan- A Call to Youth
(iii) C V Raman-Water- The Elixir of Life
(iv) Harold Nicolson- An Educated Person
(v) Claire Needell Hollander- No Learning without Feeling

UNIT 3:

(i) Comprehension of a passage and answering the questions

UNIT 4:

(i) Language exercises-test of vocabulary, usage and grammar

Text Books

All Stories and Prose pieces

Reference Books

- *The Widening Arc: A Selection of Prose and Stories*, Ed. A R Parhi, S Deepika, P Jani, Kitab Bhavan, Bh ubaneswar.
- *A Communicative Grammar of English*, Geoffrey Leech.
- *A University Grammar of English,* Randolph Quirk and Sidney Greenbaum
- *Developing Reading Skills*. F. Grellet. Cambridge: Cambridge University Press, 1981.