

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

PROGRAMME PROJECT REPORT
ON
BACHELOR OF SCIENCE (HONOURS)
(MATHEMATICS)

(To be Offered from 2026-27 Academic Session)



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Krishna Kanta Handiqui State Open University
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Registrar
Krishna Kanta Handiqui
State Open University
Guwahati

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1. OVERVIEW

The Four-Year Undergraduate (UG) Programmes of Krishna Kanta Handiqui State Open University (KKHSOU) are being prepared in accordance with the requirements of the NEP 2020. The Programmes are being prepared as per the Curriculum and Credit Framework for the Four Year UG Programmes of the UGC (December 2022) as well as subsequent official notification and the Model Framework of the Department of Higher Education, Government of Assam, dated 25 January 2023 regarding the implementation of the NEP 2020 in the State of Assam.

The 50th Meeting of the Academic Council of the University held on 27th February 2026 resolved that the Programme Project Reports (PPR) of the proposed programmes of the University would accommodate the features of NEP 2020 and UGC ODL Regulations 2020. Accordingly, the University has adopted the UGC Curriculum and Credit Framework for the UG Programmes with provisions of lateral entry and exit together with a multidisciplinary/interdisciplinary focus. Also, the assessment and evaluation has also been revised to letter grades with Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA).

Thus, the Programmes on offer incorporates Discipline Specific Core (DSC) courses along with ranges of Discipline Specific Elective (DSE) courses, which are expected to enable the learners towards receiving wider exposure and opportunities. In addition, bundles of courses are also being provided as Ability Enhancement Courses (AEC); Skill Enhancement Courses (SEC); and Value-Added Courses (VAC) to fulfil requirements of the NEP 2020.

Notably, the academic disciplines of the University are organised as School System; hence, it is expected that implementation of multidisciplinary/interdisciplinary programmes and courses would be relatively smooth and enriching. To this effect, necessary processes for attaching relevant faculty from related disciplines have been arranged. The University has also registered in the Academic Bank of Credit (ABC) for seamless transfer of credit allowing flexibility to the learners as mandated by the NEP 2020.

The Four Year UG Programme Framework of the University incorporates Indian languages, culture, values, and traditions. The Second Semester includes a 3-credit course on Yoga while the Third Semester incorporates a 4-credit course on Life Skills. Similarly, courses on Environmental Studies and Disaster Management, Cyber Security, Organic Farming etc., are also offered in the baskets of VAC and SEC.

The Centre for Internal Quality Assurance (CIQA) of the University has organised a number of meetings and workshops regarding the implementation of NEP 2020 in the context of ODL. With all the inputs, the Committee on Courses (CCS) and the Schools of Studies, involving outside subject experts drawn from reputed Universities

have designed the proposed Four Year UG Programme in Mathematics and the detail syllabi. This Programme Project Report (PPR) on Four Year UG Programme in Mathematics provides the details of the proposed Programme as per the provisions of the UGC (Open and Distance Learning Programmes and Online Programmes) Regulations, 2020.

Mathematics, being the foundation of scientific inquiry and technological advancement, plays a pivotal role in shaping logical reasoning, abstraction, and problem-solving abilities. The programme aims to provide a comprehensive and rigorous foundation in Mathematical Sciences while fostering analytical thinking, research aptitude, and interdisciplinary competence among learners. The syllabus of this Programme has been finalized after a series of deliberations and discussions with academic experts in the field.

Learners who wish to study Mathematics as a Discipline Specific Core (DSC) course should select one Elective/Minor Courses (DSE) from the following courses offered by the University i.e. Assamese, History, Sanskrit, Education, Journalism and Mass Communication, Philosophy, Political Science, Social Work, Commerce, Computer Application, Business Administration, Management and Sociology etc. The discipline of Mathematics will also be offering electives (DSE) for other learners who opt for any other course as a Discipline Specific Core (DSC) course.

Similarly, learners who wish to take Mathematics as a Discipline Specific Core (DSC) course will have to select courses from the bundles of courses provided as Inter Disciplinary courses (IDC).

The Ability Enhancement Course (AEC) is required for learners who take Mathematics as a Discipline Specific Core (DSC) Course. As compulsory AEC courses, all learners are required to study “General English”, “Alternative English/MIL”, and “Life Skills”. “Environmental Studies and Disaster Management” and “Introduction to Yoga” are compulsory Value-Added Courses (VACs) in the First and Second Semesters.

As per Curriculum and Credit Framework for the Four Year UG Programmes of the UGC (December 2022), “Cyber Security” (in Semester 3) and “Research Methodology” (in Semester 7) are two compulsory Skill Enhancement Courses (SEC) for any learners of UG programme of the University. Apart from that, “Office Management”, “Organic Farming”, “Introduction to Geo-Informatics”, “Tea Cultivation and Management” and “Electricity and “Electrical Wiring” are offered as optional Skill Enhancement Courses (SEC).

Learners of Four-Year Undergraduate Programme in Mathematics will have to present a Seminar in Semester 7. They will also have to prepare a Project/Dissertation with the help of a mentor in Semester 8. A multidisciplinary/ interdisciplinary approach is evident in the structure of the Four-Year Undergraduate Programme in Mathematics.

2. PROGRAMME'S MISSION AND OBJECTIVES

2.1 Mission and Vision of K. K. Handiqui State Open University:

- i. The motto of the University is to make education accessible beyond all barriers and to provide truly barrier-free learning opportunities to unreached learners, irrespective of gender, socio-economic background, geographical location, or physical disabilities.
- ii. It will also provide education to the housewives, semi-literate, unemployed youth, jail inmates as well as highly educated people.
- iii. The University extends opportunities for higher education to individuals who have been deprived of such access due to various personal, social, or economic circumstances.
- iv. The mission and vision of the university is to enhance the capabilities of learners, particularly women learners, who want to get empowered with higher order of required education and necessary professional skills.
- v. To provide social justice to all the stakeholders is the prime focus of the university.

2.2 Mission and Objectives of the UG Programme in Mathematics, KKHSOU

The main objectives of the Four-Year UG Programme in Mathematics offered by KKHSOU are mentioned below:

- To cultivate logical thinking, abstract reasoning, and mathematical rigor through structured study of algebraic structures, analysis, discrete mathematics, and proof-based courses.
- To equip learners with the ability to formulate, analyze, and solve mathematical problems arising in pure mathematics as well as in applied domains such as mechanics, hydrodynamics, operations research, and statistics.
- To develop computational competence through courses like Computer Programming using C and Numerical Analysis, enabling learners to apply algorithmic thinking and computational methods to mathematical problems.
- Prepare learners for research through seminar presentation, internship, project work, and dissertation in the final year, aligned with the Honours/Research exit option under NEP 2020.

- Equip learners with the academic depth required for M.Sc., Ph.D., NET, GATE, actuarial science, data science, and other national and international competitive examinations.

3. RELEVANCE OF THE PROGRAMME WITH KKHSOU'S MISSION AND GOALS

The UG Programme in Mathematics offered by KKHSOU has been prepared to confirm the mission and goals of the University along with NEP 2020. Providing quality higher education and developing holistic individuals (smart, thoughtful, well-rounded, and creative individuals) is the main motto of NEP 2020. Open Universities in the nation have played a vital role in this regard.

According to NEP 2020, Section 10.8, steps shall be taken towards developing high-quality higher education institutions both public and private that have medium of instruction in local/Indian languages or bilingually. MHRD, has planned to increase the Gross Enrollment Ratio (GER) in Higher Education from 26.3% (2018) to 50% by 2035. People generally offer the medium they know best, which is either their first or second language.

Emphasis on the promotion of the vernacular as propounded in NEP 2020 may also be addressed by launching this programme. Providing access to learning throughout life, the programme gives learners the opportunity to enter into and exit from learning at any age. This also signifies equity and access in the field of higher education.

4. NATURE OF PROSPECTIVE TARGET GROUP LEARNERS

The University targets the following group of learners in general, viz.

- Women learners especially housewives who want to get empowered with higher education and acquire professional skills.
- Differently abled persons.
- Persons who could not complete higher education in time during their student days.
- People hailing from far-flung remote areas and living in other disadvantageous conditions.
- Employed/self-employed persons with a penchant for higher education and learning skills.
- Persons who could not get access to higher education in the conventional system for various reasons.
- Working people who wish to hone their professional skills.

Apart from these, important target groups of learners of this programme are:

- Learners who have studied Mathematics at the Higher Secondary (10+2) level and wish to pursue higher studies in Mathematics.
- Learners from different backgrounds comprising the educated, under-educated, as well as the highly educated groups of people.
- Learners from the disadvantaged and the under-privileged sections of the society.
- Learners aiming for careers in data analysis, statistics, information technology, finance, and related fields requiring mathematical and computational skills.
- Individuals who cannot access conventional higher education institutions but wish to pursue a degree in Mathematics through the ODL system.

5. APPROPRIATENESS OF THE PROGRAMME TO BE CONDUCTED IN ODL MODE TO ACQUIRE SPECIFIC SKILL AND COMPETENCE

The UG programme in Mathematics is well-suited for delivery through the Open and Distance Learning (ODL) mode, provided that the programme clearly defines the skills and competencies to be developed, ensures high-quality ODL instructional design, and offers robust academic and learner support throughout the course.

Here are some of the factors that can make the UG programme in Mathematics suitable for ODL delivery mode:

- a) Flexibility: ODL mode allows learners to study at their own pace and schedule. This flexibility can be especially beneficial for working professionals who need to balance their studies with their work and personal life.
- b) Accessibility: ODL mode enables learners to access educational resources and instruction from anywhere in the world, as long as they have an internet connection. This can increase the accessibility of the program to learners who may not have the opportunity to attend a traditional, on-campus program.
- c) Cost-effectiveness: ODL mode can be more cost-effective than traditional, on-campus programs, as learners do not have to incur expenses related to travel, accommodation, and other on-campus expenses.
- d) Personalization: ODL mode allows learners to customize their learning experience to suit their needs, preferences, and learning styles. Learners can choose the specific courses or modules that align with their career goals and interests.

Overall, the UG programme in Mathematics can be appropriate for ODL delivery mode if the program is well-designed and delivered, and if learners are provided with the necessary support to succeed in an ODL environment.

6. INSTRUCTIONAL DESIGN

The University follows instructional design and procedures to ensure that the ODL programme is effective for delivering the University's UG degree. The programme is delivered in print form and through Learning Management System (LMS).

6.1 Curriculum design:

The curriculum of the Four Year UG Programme in Mathematics has been designed in accordance with the Curriculum and Credit Framework for the Four Year UG Programmes of the UGC released in December, 2022 as well as subsequent official notification and the Model Framework released by the Department of Higher Education, Government of Assam (dated January 25, 2023) regarding the implementation of the NEP 2020 in the State. Besides, other relevant documents viz. UGC Distance and Online Education Regulations 2020, UGC LOCF Curricular Framework, UGC's Academic Integrity Regulation 2018 and UGC Regulation regarding Definitions of Degrees 2014 have also been taken into consideration in finalising the curriculum. The detailed syllabus of the courses to be offered both as major and minor in Mathematics has been prepared and finalised by the duly constituted Committee of Courses (CCS) involving eminent subject experts drawn from Gauhati University and Cotton University, which has been approved by the Academic Council of the University.

6.2 Programme Structure and Duration of the Programme:

The Programme, in total, consists of 171 credit hours of courses with multiple entry and exit options. The UG degree (honours/research) in Mathematics will be awarded to the learners who complete total 20 courses in Mathematics, each with 4 credits i.e. total 80 credits of courses in Mathematics in four years. For a UG Degree (general) in Mathematics, a learner has to complete 15 courses in Mathematics, each course with 4 credits, and earn 60 credits in total in three years.

The Programme in Mathematics, whether three or four years, is to be completed with courses on a minor subject to be chosen by the learners from any of the disciplines of Social Sciences, Humanities, Commerce, Management

etc. where the University offers such courses. Total credit requirement for the minor in the Programme is 32 credits in four years; and 24 credits in three years.

To enhance the scope of learning of the prospective learners, choices are also offered to them to opt for additional courses as minor. In such case, if a learner decides to go for additional courses as minor, acquiring a total of 48 credits in three years or 64 credits in four years, she/he will be awarded with the second major (i.e. double major) in the subject taken as the minor along with her/his (first) subject taken as the major. The proposed Programme makes provisions to allow learners to get a double major should they fulfil the credit requirement.

Besides the major and minor, during the programme a learner needs to successfully complete 9 credits of Interdisciplinary Courses (IDC), 14 credits of Ability Enhancement Courses (AEC), 10 credits of Skill Enhancement Courses (SEC), 6 credits of Value-Added Courses (VAC) along with 4 credits of Research Methodology, 4 credits of Seminar or Presentation or Internship or Community Engagement or any other Value-Added Activities, together with 12 credits of Project or Dissertation.

The description of the credit distribution of the proposed Programme is given below:

Credit Distribution by Type of Courses

Sl. no	Type of Course	No of courses		Total Credit Requirement	
		3 years exit	4 years exit	3 years exit	4 years exit
1	Mathematics Courses as major	15	20	60	80
2	Related Courses as minor	6	8	24	32
3	Interdisciplinary Courses	3	3	9	9
4	Ability Enhancement Courses	4	4	14	14
5	Skill Enhancement Courses	3	3	10	10
6	Value Added Courses	2	2	6	6
7	Research Methodology Course		1		4
8	Seminar/Presentation etc.		1		4
9	Project/Dissertation		1		12
	Total	33	43	123	171

Further, the Programme is divided into 8 semesters with lateral entry and exits in 2nd, 4th, 6th semesters. The learners will be awarded with a Certificate, Diploma and Degree (General) with Mathematics if they exit in the 2nd, 4th, and 6th semesters respectively. After successful completion of the 8th semester, the learner will receive UG Degree with honours/research in Mathematics as the case may be. There will be provision for lateral entry into the 3rd, 5th and 7th semesters for those learners who had chosen to exit in the 2nd, 4th, 6th semesters earlier. The provision of the lateral entry, however, is subjected to such period as notified by the UGC from time to time and fulfilment of the credit requirement as per the UGC regulation in force.

The detailed Programme structure of the proposed Four Year UG Programme in Mathematics both Mathematics as Major and Minor:

A. Structure of the Four-Year UG Programme with Mathematics as Major

Semester	Type of Course	Name of the Course	Credit
I	Major 1	Classical Algebra and Trigonometry	4
	Minor 1 *		4
	IDC 1 **		3
	AEC 1	General English	3
	VAC 1	Environmental Studies and Disaster Management	3
	SEC 1 **		3
Total			20
II	Major 2	Calculus	4
	Minor 2 *		4
	IDC 2 **		3
	AEC 2	Modern Indian Language (MIL)/ Alternative English***	3
	VAC 2	Introduction to Yoga	3
	SEC 2*		3

Total			20
Exit 1		UG Certificate	40
III	Major 3	Abstract Algebra & Discrete Mathematics	4
	Major 4	Ordinary Differential Equations	4
	Minor 3*		4
	IDC 3 **		3
	AEC 3	Life Skills	4
	SEC 3	Cyber Security	4
Total			23
IV	Major 5	Analytical Geometry and Vector Calculus	4
	Major 6	Real Analysis	4
	Major 7	Linear Algebra	4
	Minor 4 *		4
	AEC 4	Spoken English	4
Total			20
Exit 2		UG Diploma	83
V	Major 8	Operations Research	4
	Major 9	Complex Analysis	4
	Major 10	Multivariate Calculus	4
	Major 11	Partial Differential Equations	4
	Minor 5*		4
Total			20
VI	Major 12	Number theory	4
	Major 13	Computer Programming using C	4
	Major 14	Probability and Statistics	4

	Major 15	Special Functions and Integral Transform	4
	Minor 6*		4
Total			20
Exit 3		UG Degree (General)	123
VII	Major 16	Advanced Abstract Algebra	4
	Major 17	Mechanics and Hydrodynamics	4
	Major 18	Graph Theory	4
	Minor 7 *		4
	SEC 4	Research Methodology	4
	Field Work/Project etc.	Seminar/Presentation	4
Total			24
VIII	Major 19	Metric space & Topology	4
	Major 20	Numerical Analysis	4
	Minor 8*		4
	Field Work/Project etc.	Project/Dissertation	12
	Total		24
	Exit 3	UG Degree (Honours/Research)	171

B. Structure of the Four-Year UG Programme with Mathematics as Minor

Semester	Type of Course	Name of the Course	Credit
I	Major 1		4
	Minor 1 *	Classical Algebra and Trigonometry	4
	IDC 1 **		3
	AEC 1	General English	3
	VAC 1	Environmental Studies and Disaster Management	3
	SEC 1 **		3
Total			20
II	Major 2		4
	Minor 2 *	Abstract Algebra & Discrete Mathematics	4
	IDC 2 **		3
	AEC 2	Modern Indian Language (MIL)/ Alternative English***	3
	VAC 2	Introduction to Yoga	3
	SEC 2*		3
Total			20
Exit 1		UG Certificate	40
III	Major 3		4
	Major 4		4
	Minor 3*	Differential Calculus	4
	IDC 3 **		3
	AEC 3	Life Skills	4
	SEC 3	Cyber Security	4
Total			23
IV	Major 5		4

	Major 6		4
	Major 7		4
	Minor 4 *	Integral Calculus & Differential Equations	4
	AEC 4	Spoken English	4
Total			20
Exit 2		UG Diploma	83
V	Major 8		4
	Major 9		4
	Major 10		4
	Major 11		4
	Minor 5*	Analytical Geometry and Vector Calculus	4
Total			20
VI	Major 12		4
	Major 13		4
	Major 14		4
	Major 15		4
	Minor 6*	Mechanics and Elements of Statistics	4
Total			20
Exit 3		UG Degree (General)	123
VII	Major 16		4
	Major 17		4
	Major 18		4
	Minor 7 *	Real Analysis	4
	SEC 4	Research Methodology	4
	Field Work/Project etc.	Seminar/Presentation	4
Total			24
VIII	Major 19		4
	Major 20		4
	Minor 8*	Operations Research	4
	Field Work/Project etc.	Project/Dissertation	12

	Total		24
	Exit 3	UG Degree (Honours/Research)	171

* For a learner with Mathematics as major, the minor is to be chosen from disciplines other than Mathematics.

** Learners will have to choose from a basket of courses as mentioned in Annexure III.

*** MIL options offered by the University are Assamese, Bengali, Bodo and Hindi. There is also the option of Alternative English in lieu of MIL. Details of the courses are mentioned in Annexure III.

**** Guidelines for Seminar/Presentation of UG Programme in Mathematics is available in Annexure IV. Guidelines for Project/Dissertation of UG Programme in English is available in Annexure V.

The detailed course wise syllabus of the UG Programme in Mathematics is given in Annexure I.

The minimum period for completion of the Programme and award of the Certificate, Diploma, Degree (General) and Degree (Honours/Research) in English, hence, are 1 year (2 semesters), 2 years (4 semesters), 3 years (6 semesters) and 4 years (8 semesters) respectively. The maximum period of completion for the Certificate, Diploma, Degree (General) and Degree (Honours/Research) in Mathematics will be double the minimum completion period for the same as per the provision of UGC ODL and Online Regulation 2020 under Clause 13 of the Part III. Further, if a learner is not able to qualify a course in the first attempt, she/he shall have to qualify in the particular course within the next four attempts, subject to maximum duration of the study.

6.3 Definition of Credit Hours:

The University follows the UGC ODL and Online Regulations 2020 in defining credit hours. Accordingly, it requires 30 hours of study per credit of a course. Thus, a 4-credit course requires 120 hours of study in total, which includes time required to study the Self Learning Materials, completion of assignments, attending counselling sessions, accessing other learning materials provided to the learners as and when required. Out of the total credit hours, a minimum of 10 percent, i.e., minimum 12 hours of counselling per course are offered to learners at their respective study centres or through centralised online counselling conducted by the faculty members of the University.

6.4 Faculty and Support Staff Requirement

The Discipline of Mathematics of Hiranya Chandra Bhuyan School of Science and Technology of the University currently has five full time faculty members. A list of faculty members and course coordinators against each core course and other courses offered by Discipline of Mathematics of this UG programme is presented in Annexure II.

Notwithstanding the above, as the proposed Programme has been designed with multi/interdisciplinary focus with courses on Mathematics, Spoken English, MIL/Alternative English, Environmental Studies and Disaster Management, Cyber Security, Yoga etc. besides minors in variety of subjects, support from the faculty within and across various Schools beyond those from the discipline will be necessary. Towards this, the University has made necessary administrative provisions of attaching faculty from the concerned disciplines, both within and across Schools for smooth and efficient conduct of the proposed Programme. Moreover, support for counselling to the learners will be provided through a network of well-qualified and experienced counsellors at their respective study centres.

While delivering this programme, support is continuously received from the SLM Branch, Multimedia Unit, Central Library, Study centre Branch etc. of the University as well as from the people associate with the study centres spread across the state of Assam.

6.6 Instructional Delivery Mechanism

The Self Learning Materials (SLMs) have been prepared keeping in mind the requirements of instructional design. Special attention has been given on the basic three domains of knowledge, viz., the behavioural domain, cognitive domain, and constructive domain which are addressed in keeping with the General Learning Tasks and the necessary requirements as mentioned in the diagram below:

The Self Learning Materials have been prepared keeping in mind the requirements of instructional design. Particular attention has been given so that the basic three domains of knowledge, viz., the behavioural domain, cognitive domain, and constructive domain can be addressed. In general, the University offers printed SLMs and the same in audio-visual formats. Apart from that, plans are being made to deliver the UG Programme in English through LMS. The LMS would consist of four quadrants: video lectures, downloadable/printable reading material, self-assessment tests through tests and quizzes, and an online discussion forum for clarifying questions. As majority of the learners are from rural areas and disadvantage groups, attempts are made to make the SLMs easy to read and easy to understand with the following major components:

- a) *Learning Objectives* (major objectives of the Unit are stated)

- b) *Introduction* (linkage with previous Unit as may be applicable and general introduction of the content is provided)
- c) *Check Your Progress* (generally after every section CYP is provided to learners to gauge their understanding)
- d) *Answers to Check Your Progress* (CYP answers are provided at the end of the Unit)
- e) *Activity/Activities* (activities for enhancing learners' critical outlook is included in SLM)
- f) *Let us Know* (Depending on the necessity some important information related to the content is provided in a box)
- g) *Let us Sum up* (a pin-pointed summary of the Unit is given) Further Reading (this section is incorporated for those learners who are interested in further developing their knowledge on the respective content)
- i) *Model Questions* (Possible types of questions are provided in the unit).

6.7 Identification of Media—print, Audio or Video, Online, Computer Aided

All learners will be provided with print as well as e-SLMs, which are quite comprehensive in terms of the coverage of the contents of the syllabi. The faculty of the discipline have also prepared Unit wise video lectures and presentations for the courses of the Programme. These are hosted in the University's own YouTube channel <https://www.youtube.com/@kkhsou>.

These audio-video contents together with the e-SLMs are sourced to the University's LMS e bidya (<https://www.lmskkhsou.in/web>) in such a way so that the learners can access these digital contents at ease according to their Programme and course requirements.

The prospective learners of the Programme will also be introduced with the initiatives like e GyanKosh (<https://egyankosh.ac.in/>) and free DTH channel for education Swayam Prabha (<https://www.swayamprabha.gov.in/index.php/>) wherein the University also partners in providing digital contents. Many of the University's digital contents are also available and/or archived in channel no. 20 under Swayam Prabha since April 2021, which can be accessed through the e-GyanKosh portal.

Further, in pursuance of the UGC's notification and guidelines the University has also adopted a policy of allowing the learners to undertake MOOCs from the Swayam platform as identified and duly approved by the University for credit transfers in various semesters as and when required.

In addition, certain topics are also covered through community radio programmes of the University broadcast through the 90.0 FM Jnan Taranga Community Service Station of the University. Most of the audio-video programmes are accessible online through the University's website and its official YouTube channel.

6.7 Learner Support Services

The learners of the proposed bachelor programme in Mathematics would be provided with a wide range of support services helping them to imbibe the required knowledge and skills; to seek avenues in gainful employment; to go for higher studies; and to provide in-depth disciplinary knowledge. Learner support services of the proposed Programme include, inter alia, the following:

(a) KKHSOU City Campus:

The KKHSOU City Campus at the heart of Guwahati city organises training for coordinators, counsellors, and other functionaries. The city centre provides a venue for learners and academic counsellors to interact on a particular subject matter. Responsibility for admission, distribution of SLMs and Examination also lies with the City Campus. Besides, faculty of the University conducts online counselling regularly which is open to learners from all study centres. The City Campus has the provision of walk-in-counselling for the learners in all working days. In addition, the City Campus hosts a model study centre fully managed and maintained by the University with all infrastructural facilities including regular face to face counselling by the University faculty and outside subject experts.

(b) Regional Centres:

The Regional centre of KKHSOU located at Jorhat in upper Assam provides training for coordinators, counsellors, and other key functionaries. The centre provides a venue for learners and academic counsellors to interact on various matters, responding to their queries and clearing their doubts. Responsibility for Admission, distribution of SLMs and 10 Examination in select districts of upper Assam also lies with Regional Centres. Establishment of some other regional centres is in the pipeline.

(c) Study Centres/Learners' Support Centres:

Study centres form the backbone of an open and distance learning institution. Acting on behalf of the University, they address the diverse needs of learners, including providing admission-related information, distributing Self-Learning Materials (SLMs), conducting counselling sessions, managing the distribution, collection, and evaluation of assignments, and facilitating both formative and summative assessment requirements. Spread across the state, these centres efficiently carry out these responsibilities on behalf of the University. At present, there are 343 study centres offering support services to learners.

(d) Pre-admission Counselling:

In cooperation with the study centres, the University provides pre-admission counselling for all the programmes through online and offline modes. It provides basic information about the various aspects of the Programme viz. salient features of the Programme, eligibility and cost of the Programme, modes of delivery of the Programme, details of counselling sessions, assessment processes and opportunities and options available after completion of the Programme to the learners. Also, Programme specific pre-admission counselling is also provided to the aspiring learners.

(e) Learners' Charter:

The University has brought out a Learners' Charter, which can be accessed at https://kkhsou.ac.in/web/index_page_details.php?page=TWxXNXpxdHZ5eVIYYmFxNkI2SHI5Zz09&title=learners-charter, pronouncing the basic rights and responsibilities of its learners and those of the University to the learners. In the Induction Programmes at the Study Centres, the learners are sensitized about this Charter.

(f) Audio CDs for Visually Impaired Learners:

The visually impaired learners are provided with free audio SLMs in CDs to overcome their difficulties of learning. The University has installed Braille printers for this category of special learners in the University SLM branch.

(g) Face-to-face/Online Ticketing/Complaint System:

Learners' queries are attended to in the face-to face mode and digital mode as well in a continuous way, through telephone, SMS and emails. There is a dedicated online portal https://kkhsou.ac.in/web/index_page_details.php?page=cy9oSHdRK1ZaMFe0V3BIQUhWS1hjdZ09&title=grievance-redressal through which the queries received are automatically moved to concerned department for solving the same. Once the problem is solved, the learner is informed by SMS and email. The University also has a single window grievance redress cell for handling the grievances of the learners.

(h) Face to face, online and walk-in Counselling:

The learners of all programmes are provided with face-to-face counselling at the study centres. The University also provides face-to-face counselling to learners at the University's Model Study Centre located at the City Campus Sundays by its faculty and other qualified and experience counsellors. Besides, the University faculty offers online counselling to all learners on a regular basis for various programmes. The routine is made available through the University's website, and the links are shared through the mentoring groups. Further, the University's City Campus also provides walk-in-counselling to the learners on all working days wherein they get an opportunity to come to the City Campus of the University and meet the concerned faculty for clarification of their doubts and queries.

(i) ICT Support: ICT support is a major component of any ODL system of education. Some of the important ICT-based support services provided by the University for the learners are briefly described below:

- **Website:** The University has a full-fledged official website www.kkhsou.ac.in which contains all relevant information and resources for learners and the general public. It has a Learners' Corner https://kkhsou.ac.in/web/index_learners_zone.php that contains exhaustive information and links to useful resources. It also provides links for downloading e-SLMs, assignments, e-admits, e-mark sheets etc. besides important notices and latest news. Furthermore, the Website provides links to social-networking sites like Facebook where learners, faculty members, and stakeholders can

interact. Additionally, the site offers a tailored search by Programmes and Study Centres. Also, most of the audio-visual learning resources are accessible online through YouTube videos (accessible at <https://www.youtube.com/user/kkhsou>)

- **University's Own LMS e-Bidya:** As part of its ongoing attempts to enhance learners learning, the University has developed a Learning Management System (LMS) portal called e-Bidya using open-source MOODLE which can be accessed via <https://lmskkhsou.in/web/>. The site allows learners to access e-resources 24 X 7, regardless of where they are in relation to the particular programme they are enrolled in. It contains all four quadrants including video lectures and tutorials and reading materials. Learners can also interact with experts through the discussion forum. Learners can experience the benefits of online learning through their mobile devices as well. The proposed Programme will also be made available in e-Bidya with all resources for all learners enrolling in the Programme.
- **E-Mentoring:** The University introduces an innovative e-mentoring system where a group of learners enrolled in a Programme is placed under the mentorship of a faculty of the University from the concerned discipline. This facilitates a bonding between the mentor and the mentees helping the learners to continue their studies with self-confidence, self-esteem, morale, and a feeling of identity. The main objective of this initiative is to help learners minimise personal difficulties and identify the obstacles they face in matters related to academic as well as non-academic. During this process, they are also guided to develop appropriate learning strategies for overcoming these difficulties and problems. The e-mentoring system, utilises the Telegram App and/or WhatsApp, and helps learners derive all the benefits of open and distance learning at their fingertips instantly.
- **Community Radio Service:** The University introduced the first Community Radio station in the North Eastern part of the country Jnan Taranga (90.0 MHz). The Community Radio, being a platform for the Community for taking up Community issues, is also a platform for broadcasting educational programmes. This includes debates, discussions, talk shows and phone in Q & A sessions with the learners. Recently, the programmes of Jnan Taranga are made available over internet radio, which can now be heard by all learners though <https://kkhsou.ac.in/web/jnantaranga/index.html>
- **Digital Library:** The digital library at <https://dlkkhsou.inflibnet.ac.in/> of the University hosts a large number of resources which include documents, SLMs, ebooks, conference/seminar proceedings, faculty publications, theses and dissertations etc. Links are also provided to other open access resources which can be easily accessed by the learners.

- **Online Counselling:** The University's faculty conducts online counselling sessions through different online platforms like Zoom, Google Meet, and Cisco WebEx etc. Sessions are also conducted through Facebook Live on examination related issues especially during the time of pandemic. Most of the online counselling sessions are recorded and archived as additional digital learning resources for the use of the learners.
- **SMS Alert Facility:** The University has implemented an SMS alert system for learners for sending notification of university news, events, and similar other learner-related information.
- **E-mail Support:** Learners can also write emails to any officials/faculty members of the University at atinfo@kkhsou.in and grc@kkhsou.in. Concerns raised through email are addressed by the concerned officials or faculty members. Apart from that, the email and phone numbers of all faculty members are available on the website and Information Brochure. Any learners can write directly to them as well for any kind of support and assistance.
- **KKHSOU in Social Media:** KKHSOU has incorporated social media like Facebook pages (<https://www.facebook.com/groups/272636986264210>) WhatsApp group, Twitter Account (<https://twitter.com/KKHSOU1?s=09>) to its official website that enables interaction with the learners on a real time basis. Facebook also allows moderated discussions within as well as among the learners' Community.

7. PROCEDURE FOR ADMISSION, CURRICULUM TRANSACTION AND EVALUATION

7.1 Procedure for Admission

- Minimum Qualification:** For admission to the UG Mathematics programme, learners must have passed **10+2** with Mathematics or possess an equivalent qualification from a Council/University recognized by the UGC or a Polytechnic diploma in any field.
- Online Admission:** Admission to this UG programme would be offered by KKHSOU through online in the University website: www.kkhsou.in. A prospective learner may take admission as per his/her choice in KKHSOU City Study Centre, Khanapara, Jorhat Regional Centre, Jorhat or any other recognized study centre for this programme in the State of Assam. A learner is to submit all relevant documents for admission through the online admission portal. The course fee is to be paid through credit card/ debit card/ net banking or UPI- Bharat QR, BHIM, PhonePe, Gpay, Paytm, WhatsApp and other UPI. After admission is done, a unique Registration / Enrollment Number is automatically generated which will have to be used for future communications with the University. Based on his/her choice, and operational

conveniences, a learner shall be assigned to a particular study centre for availing of dedicated services and 17 counselling/tutoring facilities. The newly admitted learners will receive the SLMs through a dedicated study centre and in certain cases SLMs may be sent to the learners' home address also. E-SLMs are also available on the University website

- iii. **Refusal/Cancellation of Admission:** At the time of admission the candidate must submit a declaration that he/she is not pursuing more than two-degree programmes under KKHSOU/any other recognised University or Institution simultaneously. If any false declaration is detected at any stage, his/her admission/mark sheets/ certificates may be cancelled by the University.
- iv. **Continuous Admission:** By paying the necessary fees, a learner can obtain admission to the next semester once a particular semester is completed. Admission to the subsequent semester is not determined by the results of the previous semester. One may take admission in the next semester even without appearing in the previous semester examination. The admission period should be continuous from the date of completion of the previous semester's exams until 60 days after the start date. Incomplete exams, including back papers, will be allowed to be taken up when announcements of examination results are made. Learners are advised to regularly visit the University's website (www.kkhsou.in) and maintain regular contact with their allotted study centres.
- v. **Lateral Admission:** The University, following the NEP 2020's mandate and the UGC's guidelines, adopts the policy of lateral admission to all its UG and PG programmes. Accordingly, provisions for lateral entry into the 3rd, 5th and 7th semesters are made for those learners who had chosen to exit in the 2nd, 4th, 6th semesters earlier due to various reasons. For this the University adopts a credit transfer policy to facilitate the process of lateral admission to all the UG and PG programmes.
- vi. **Dual Degree:** The University has implemented and also promotes the system of dual degree as per the UGC's notification and guidelines dated April 2022. Learners are encouraged and allowed to register in academic programmes simultaneously including UG and PG programmes in order to enhance their choices and opportunities. The aspiring learners of the proposed Programme will also be encouraged to take advantage of this provision at the time of their admission.
- vii. **Fee-Waiver for Differently Abled Persons (DIVYANGJAN):** The fee waiver will be applicable for differently able learners in all semesters of the programme where he/she has enrolled. Such learners must submit 'Form no. IV' issued by the Social Welfare Department or Disability and a copy of the Certificate issued by the Department of Empowerment of Persons with Disabilities, Ministry of Social Justice and Empowerment, Govt. of India. The forms/certificates of differently able learners which are verified by the Social Welfare Department, Govt. of Assam will be allowed the fee waiver for the eligible learners of this UG Mathematics Programme also.
- viii. **Fee Waiver for Jail Inmates:** The University also offers free education to jail inmates in all the programmes. At present, the University offers free education to jail inmates in 16 district jails of the state.

The University is in the process of including more numbers of Central/District Jails in the coming Academic Session.

- ix. **Economically Weaker Section (EWS):** The learners applying for admissions in EWS category shall submit EWS documents as per the latest Govt. of Assam guidelines.
- x. **Fee Structure:** The fee structure of the UG programme in Mathematics would have a break-up across semesters of the programmes. The fee is inclusive of Enrolment fees, Course fee, Examination fee, Exam centre fee and Mark-sheet fee. Currently the fee charged for one semester of this UG programme in Mathematics is **Rs. 3850/-**.
- xi. **Financial Assistance:** The University offers free education to jail inmates and differently abled learners. At present, the University offers free education to jail inmates in 16 district jails of the state. The university is in the process of including more numbers of Central/District Jails in the coming Academic Session.

7.2 Curriculum Transaction

- i. **Activity Planner:** There will be an activity planner, which guides the overall academic activities in the UG programme in Mathematics. This will be released prior to the university's admission schedule. The office of the Academic Dean would upload the Academic Plan and month wise Academic Calendar. This will enable learners to plan their studies and activities accordingly.
- ii. **Self-learning Materials (SLMs):** SLMs are designed in such a way that learners can easily follow them. With the help of subject experts. SLMs are prepared with relevant and up to date information and facts.
- iii. **Multimedia Materials:** Apart from the printed and digital copies of the SLMs, the university provides multimedia learning materials in the form of audio-video presentations, tutorial videos, and recorded versions of the online counselling sessions etc. related to the course content of various academic programmes. Such materials will also be prepared and provided to learners of the proposed Programme.
- iv. **Induction and Counselling Sessions:** Induction sessions are conducted by university officials and faculty together. Counselling sessions are conducted by the Study Centres. Normally all counselling sessions are scheduled on Sunday. A face-to-face interaction between the learners and the counsellor takes place during the counselling session. This enables learners to clear their doubts with regard to the various courses provided to them. Apart from that, from time to time, online counselling sessions will be provided by the faculties of the University for the Four-Year UG Programme in Mathematics.

7.3 Assessment and Evaluation

The assessment and evaluation of the learners' performance in all academic programmes of the University are carried out with the objectives of maintaining sanctity, quality and transparency. The assessment and evaluation of the learners' performance and achievement are conducted with reference to the defined learning outcomes of the programmes as a whole, and also those of the courses under a specific programme. While setting the question papers, assignments and evaluation of answer scripts this aspect is always considered thoughtfully.

The assessment and evaluation system of the University consists of two components i.e. Formative and Summative Assessments as per the UGC regulation of 2020. The 44th Academic Council of the University decided that Formative Assessment is to be given a weight of 30 percent. The questions of internal assignments will be according to the format given by Controller of Examinations. On the other hand, the Summative Assessment is to be assigned the remaining 70 percent of the weight. Further, 44th Academic Council has adopted the SGPA and CGPA system of evaluation as per the UGC's Curriculum and Credit Framework for UG Programme, 2022. As per the UGC's Curriculum and Credit Framework for UG Programme, 2022, the "Letter Grades" will be provided to the learner after due assessment and evaluation as given in Table 3.

Table 3: Letter Grades System of KKHSOU

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4

The Semester Grade Point Average (SGPA) will be computed from the grades as a measure of the learner's performance in a given semester. The SGPA will be based on the grades of the current term, while the Cumulative GPA (CGPA) will be based on the grades in all courses taken after joining the programme of study. Here SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a learner in all the courses taken by a learner and the sum of the number of credits of all the courses undergone by a learner, while the Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the

courses undergone by a learner over all the semesters of a programme. As recommended by the UGC, the SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts. Based on the above-mentioned Letter grades, grade points and SGPA and CCPA, the transcript for each semester and a consolidated transcript indicating the performance in all semesters will be provided to the learners.

Notwithstanding, the details of the Formative and Summative assessment followed by the University, which will also be followed in case of the proposed Programme, are described in sections 7.3.1 to 7.3.3.

7.3.1 Formative Assessment

Continuous and comprehensive assessment is an important component of the total assessment process in KKHSOU. There is provision for self-evaluation based on the Self-Learning Materials. The University has decided to adopt a mechanism for continuous evaluation of the Learners through a mix of various flexible methods. Considering the practical limitations of the learners and the difficulty of administering, the University has adopted the formative assessment mechanism with the following in view. The learners are communicated about the details through the University website, official notifications, study centres and social media. Assignments totalling 50 marks (10+10+10+10+10) will be assigned for each course by the respective discipline. The formative assessment comprises:

- a. A closed-ended assignment directly derived from the course or study material = 10 marks.
- b. Two open-ended assignments requiring analytical, opinionated, or reflective responses from the learner based on the course content = 20 marks.
- c. An assignment pertaining to an environmental topic = 10 marks.
- d. Additional assignments in lieu of multiple-choice question tests = 10 marks.

The learner's marks will be allocated by the relevant study centers according to the breakdown provided for (a), (b), (c), and (d), totalling 50 marks, which will be automatically reduced to 30 marks by the system. However, for courses with practical components, the distribution will be 50% weightage for theory, 30% weightage for practical and 20% weightage for internal assessment. Concerned study centres will arrange Personal Contact Programmes (Online or Offline) and the learners need to attend the same, as per UGC Guidelines. The coordinators of the study centres will submit the marks after assessments, through the Home Assignment portal of the University.

7.3.2 Summative Assessment

The Summative Assessment is conducted in pen and paper mode in designated study centres (for 70% of total marks). The University follows a SOP in conducting these examinations. Besides, examination monitoring is an essential feature in conducting the examinations of the University. The University appoints Supervisory Officers (SO), Examination Monitoring Officers (EMO) and Examination Squads on a regular basis for smooth conduct and maintaining the standards of the examinations. Question papers are set and moderated, and answer scripts are evaluated by both internal and external faculty members. Results are declared after a process of due scrutiny and thorough diligence check. The learners have the options of re-scrutiny and re-evaluation of their answer scripts (within a stipulated time) in case they are not satisfied with the result.

7.3.3 Seminar/Presentation/Project Report

A learner has to prepare a project report on a particular topic under the guidance of a professionally qualified supervisor/guide in Semester VIII of the UG Mathematics programme. In this course, learners should take up a problem related to the subject area.

8. REQUIREMENT OF THE LABORATORY SUPPORT AND LIBRARY RESOURCES

8.1 Laboratory Support

Although the courses within the proposed Four-Year UG programme in Mathematics do not heavily rely on laboratory services, learners may be provided with support through computer laboratories. Access to these facilities is available at their respective study centres and the University's city campus. In Guwahati, the city campus boasts two cutting-edge computer laboratories equipped with free and open-source software, including a compiler for the C programming language—a crucial component of the program's syllabus. Learners can utilize these resources for practice independently, even without direct laboratory support.

8.2 Library Resources

Library services are offered to the learners of KKHSOU through physical library facilities in its recognized study centres and also through the central library set up by the University at its city campus. Reference books are suggested by the faculty of the respective Disciplines/Schools of the University and also by the SLM writers. The

Central Library at KKHSOU has a sizeable repository of relevant reference books and textbooks relating to the UG Programme in Mathematics. As in March 2026, the library houses approximately 20,000 print books along with 8 newspapers and 7 magazines and 2 print journals. In addition to print materials, the library provides access to a wide range of electronic resources, including e-journals, online databases, and gateway portals. Programme-specific journal subscriptions are communicated to learners as they become available.

The library is fully automated using an Integrated Library System (ILS) and is equipped with RFID (Radio-Frequency Identification) technology to enhance efficiency and accessibility. Learners can access library services at their convenience through the library webpage (<http://library.kkhsou.in/>). They can also utilize the Digital Library (<http://dlkkhsou.inflibnet.ac.in/>), which serves as an online platform for collecting, preserving, and disseminating the University's academic and intellectual output to a global audience. Beyond physical access, the library offers an Online Public Access Catalogue (OPAC) (<http://opac.kkhsou.ac.in/>), enabling users to browse and search the library collection remotely.

The University has implemented an Open Educational Resources (OER) Policy, which governs the development and dissemination of learning materials in both physical and digital formats. Furthermore, KKHSOU has entered into a Content Partner Agreement with the National Digital Library of India (NDLI), facilitating access to a vast repository of national and international digital resources through a single-window platform (<https://ndli.iitkgp.ac.in/>). To further strengthen digital access, the University integrates resources from the Open Network for Open Science (ONOS), providing learners with access to a wide range of scholarly publications, research outputs, and open-access academic content.

The University also participates in Shodhganga, the national repository of theses and dissertations maintained by the INFLIBNET Centre, at UGC. Through this initiative, the theses produced by the University are archived and made available to scholars and researchers, thereby contributing to the broader dissemination of academic research.

Overall, the KKHSOU library system ensures comprehensive academic support by combining traditional resources with advanced digital services, thereby catering effectively to the diverse needs of learners enrolled in the UG Programme in Mathematics.

9. COST ESTIMATE OF THE PROGRAMME AND THE PROVISIONS

The Office of the Finance Officer of KKHSOU keeps all the records of finances regarding print of SLMs, honorarium paid to the members of the Committee on Courses, honorarium to be paid to Content Writers, Content Editors, Language Editors, Translators, Proof Readers and also the expenditure related with organizing counsellors' workshops, meeting of the co ordinators of the study centres etc. Moreover, the finance office also

maintains records of purchase of computers, online space, books, journals etc. The accounts are maintained as per the laid down procedures of government.

Regarding the cost of programme development, programme delivery, and programme maintenance, the finance office conducted an exercise based on historical costing method to arrive at indicative figures of cost. The findings are presented below in respect of the UG programme in Mathematics.

9.1 Programme Development Cost

The office of the Finance Officer of KKHSOU has worked out the following also.

- a. SLM Development Cost for Bachelor Programme: Rs. 7,600/- per Unit. A 4-credit course normally has 14 Units. In Four Year UG Programme, there will be 41 Courses. The discipline-specific courses will be explicitly attributed to this programme. The rest can be apportioned depending on the learners' enrolment and number of units to be printed.
- b. Printing Cost per Unit of SLM: Rs. 69. However, this also depends on the print number as scale related advantage of cost is normally availed.

9.2 Programme Delivery Cost

The SLMs prepared have to be delivered to the learners and various study centres located at the far-flung remote areas. On average, the University delivers about 2.2 KGs of study materials per student. The cost of delivery of 1 KG of such material is Rs.60/- per semester. Accordingly, depending upon the number of candidates; the cost for the UG English Programme will be provisioned by the University. The office of the Finance Officer has calculated the delivery cost of SLM per student at Rs. 132.00. Moreover, there will be apportionable expenditures on providing LMS-based services for which a detailed exercise will be required.

9.3 Programme Maintenance Cost

The University will keep financial provision for organizing stake holders' meetings, counselling workshops etc. as per the Academic Plan and Academic Calendar approved by the Academic Council of the University. The workshops conducted by the University will not only benefit the learners of the programme, but will also benefit the learners of other programmes. The University will also bear the cost of organizing the meetings of Committee on Courses, School of Studies, Academic Council etc. and also for supply of additional study materials if required for improving the quality of the programme. Moreover, the University will keep on investing in developing the

IT infrastructure so that the learners can benefit from the ICT enabled programme. The cost calculated by the Office of Finance Officer as regards maintenance of UG programmes- is Rs. 650.00. The figures as indicated above will be applicable for the UG Programme in Mathematics of the University. The University will keep adequate financial provision for development, delivery, and maintenance of the programme presented as per the Programme Project Report.

11. QUALITY ASSURANCE MECHANISM AND EXPECTED PROGRAMME OUTCOMES

10.1 Quality Assurance Mechanism:

With regard to quality assurance of all the Programmes of the University including the Four-Year Undergraduate Programme in Mathematics, the University is involved in the following activities:

- The programme design and structure is decided upon after a series of discussions and deliberations with a team of a few carefully chosen subject experts, who are mostly eminent scholars and professionals from the reputed institutions of higher education. Formed with due approval from the University authority, this Committee on Courses is helped by the in-house discipline and School faculties while preparing the framework of the programme. For implementation of NEP 2020, the University has networked with IGNOU, State Open Universities in India and other Universities in Assam by organizing workshops and participating in various meetings and seminars. Inputs from these discussions were used as quality benchmarks in designing the academic programmes.
- The University has a SLM Policy which is followed in development of SLM. (Link: <https://dlkhsou.inflibnet.ac.in/handle/123456789/825>) SLM Audit is a regular feature of the University which is conducted by CIQA. The course material writers and content editors are mostly in academics from reputed higher educational institutions. SLMs are distributed through a well laid down mechanism to all the learners by a mix of modes. Moreover, eSLM has been made available. Like the SLM Policy, the University has adopted wide approaches for development of policies, Strategic Action Plan and their implementation.
- CIQA takes care of the following among others to enhance the quality of the various facets of the University:
 - Counsellors' workshops
 - Stakeholders' meetings
 - Feedback responses from the learners from various programmes
 - SLM Audit

- In order to keep the Four-Year Undergraduate Programme in English updated, the programme would be revised, and necessary changes would be incorporated for the benefit of the learners, based on the inputs received from the mechanism as mentioned above. Learners' and stakeholders' feedback is regularly collected and based on that; remedial measures and improvement mechanisms are worked out.

10.2 Expected Programme Outcome:

After completing this UG Mathematics programme, the learners will be able to

- a) Develop a strong foundation in core areas of mathematics such as algebra, calculus, real analysis, differential equations, topology, and numerical analysis.
- b) Demonstrate logical reasoning, critical thinking, and the ability to construct mathematical proofs and arguments.
- c) Apply mathematical principles and analytical techniques to solve theoretical and real-life problems systematically.
- d) Apply mathematical knowledge to interdisciplinary fields such as computer science, physics, economics, operations research, and data science.
- e) Acquire the ability for lifelong learning and pursue higher studies, research, or careers in academia, industry, and related fields.
- f) Use probability and statistical techniques to analyze data, interpret results, and make informed decisions.
- g) Develop motivation for lifelong learning and pursue higher studies or professional opportunities in mathematics and related fields.

The Bachelor of Science (Honours) in Mathematics programme is designed to develop strong foundational and advanced mathematical abilities, analytical reasoning, computational proficiency, and problem-solving skills. In alignment with the principles of outcome-based education and the guidelines of the UGC, the expected Programme Outcomes (POs) are as follows:

PO1: Comprehensive Disciplinary Knowledge

Learners will understand, explain, and apply core and advanced concepts of Mathematics—including Algebra, Calculus, Differential Equations, Real Analysis, Linear Algebra, Number Theory, Mechanics, Graph Theory, Metric Spaces, and Numerical Analysis—to solve theoretical and applied mathematical problems.

PO2: Analytical and Logical Reasoning

Learners will develop strong analytical thinking, logical reasoning, and abstraction skills required to analyze mathematical structures, prove theorems, evaluate algorithms, and interpret quantitative information.

PO3: Problem-Solving and Mathematical Modelling

Learners will formulate, model, and solve real-world problems using mathematical tools such as differential equations, optimization techniques, numerical methods, probability models, and operations research.

PO4: Computational and Programming Skills

Learners will acquire computational proficiency through numerical methods, algorithmic thinking, and programming skills (especially in C), enabling them to implement mathematical procedures and solve computational problems efficiently.

PO5: Geometrical and Physical Insight

Learners will interpret mathematical concepts geometrically and apply them to physical systems, including mechanics, hydrodynamics, vector calculus, and multivariable analysis.

PO6: Research Aptitude and Inquiry-Based Learning

Learners will develop curiosity, mathematical inquiry, and the ability to explore advanced topics through proofs, problem-solving, and independent learning, preparing them for higher studies and research.

PO7: Effective Mathematical Communication

Learners will communicate mathematical ideas clearly and logically through symbolic expressions, proofs, diagrams, graphs, programming outputs, and written or oral presentations.

PO8: Critical Thinking, Creativity, and Innovation

Learners will develop the ability to critically analyze mathematical arguments, evaluate alternative methods, and propose innovative solutions to mathematical and interdisciplinary problems.

PO9: Ethical Responsibility, Professional Values, and Societal Awareness

Learners will understand the ethical use of mathematical tools, accuracy in computation, responsible data handling, and the societal relevance of mathematics in technology, finance, environment, and scientific development.

PO10: Academic Preparedness and Career Progression

Learners will acquire the academic foundation, quantitative aptitude, and analytical skills required for postgraduate studies (M.Sc., MCA, Data Science, Actuarial Science), competitive examinations, teaching careers, and professional roles in industry, research, and government sectors.

10.3 Learning Outcome based Curriculum Framework (LOCF) of B.Sc. Mathematics (Honours) Programme

The Bachelor of Science in Mathematics (Honours) programme is developed in accordance with the UGC Learning Outcome-Based Curriculum Framework (LOCF) and aligned with the NEP 2020 Four-Year Undergraduate Programme (FYUGP) structure. The framework ensures a learner-centric, outcome-oriented, and competency-based approach to curriculum design, delivery, and assessment.

Table: Course Objectives and LOCF of the B.Sc. Mathematics (Honours) Programme

Sem	Name of Course	Type of Course	Course Objectives	Course Outcomes
I	Classical Algebra and Trigonometry	DSC 1	- To provide learners with the concepts of polynomial equations, relations between roots and coefficients, and symmetric functions of roots. - To develop understanding of determinants, matrices, rank, eigenvalues, eigenvectors, and Cayley–Hamilton theorem. - To introduce De Moivre’s theorem, trigonometric expansions, hyperbolic functions, and trigonometric series.	Learners will be able to: - Solve higher-order algebraic equations and systems of linear equations. - Determine rank, eigenvalues, eigenvectors, and inverse of matrices - Learners will be able to apply De Moivre’s theorem and extract roots of complex numbers. - Expand trigonometric and hyperbolic functions and evaluate trigonometric series.

II	Calculus	DSC-2	- To introduce functions, limits, continuity, differentiability, and successive differentiation. - To develop understanding of applications of derivatives, Mean Value Theorems, partial derivatives, and optimization. - To impart knowledge of integration, definite integrals, reduction formulae, and applications to geometry.	Learners will be able to - Compute derivatives, evaluate limits, and apply L'Hospital's rule. - Apply Rolle's, Lagrange's, and Cauchy's Mean Value Theorems. - Evaluate definite integrals and apply integration to areas, lengths, and volumes.
III	Abstract Algebra & Discrete Mathematics	DSC-3	- To introduce relations, functions, binary operations, groups, rings, fields, and vector spaces. - To develop understanding of combinatorics, logic, and Boolean algebra.	Learners will be able to - understand groups, subgroups, cosets, normal subgroups, and homomorphisms. - Apply Lagrange's theorem and properties of rings and fields. - Analyze vector spaces, basis, dimension, and linear independence. - Apply combinatorics, logic, and Boolean algebra to mathematical reasoning.
	Ordinary Differential	DSC-4	To introduce formation, classification, and solution methods of ODEs.	Learners will be able to solve first-order and

	Equations		To study linear differential equations, Cauchy–Euler equations, and series solutions.	higher-order linear differential equations. - Apply variation of parameters, undetermined coefficients, and operator methods. - Obtain series solutions near ordinary and singular points.
IV	Analytical Geometry and Vector Calculus	DSC 5	To develop understanding of coordinate geometry, conics, 3D geometry, and vector calculus.	Learners will be able to - Analyze straight lines, circles, conics, planes, spheres, cones, and cylinders. - Compute dot and cross products, scalar triple products, and vector projections. - Apply gradient, divergence, curl, and vector identities.
	Real Analysis	DSC-6	To introduce real number systems, sequences, series, limits, continuity, and convergence tests.	Learners will be able to: - Understand completeness, supremum/infimum, and countability. - Analyze convergence of sequences and series using standard tests.

				Study power series, uniform convergence, and function sequences.
	Linear Algebra	DSC-7	To study vector spaces, linear transformations, eigenvalues, canonical forms, and inner product spaces.	Learners will be able to: - Analyze vector spaces, basis, dimension, and rank. - Apply linear transformations, matrix representations, and change of basis. - Compute eigenvalues, eigenvectors, and canonical forms. - Apply Gram–Schmidt process and study orthogonality.
V	Operations Research	DSC-8	To introduce linear programming, simplex method, duality, transportation, assignment, game theory, and PERT/CPM.	Learners will be able to: - Formulate and solve LPPs using graphical and simplex methods. - Apply duality, sensitivity analysis, and optimization techniques. - Solve transportation, assignment, and game theory problems.
	Complex Analysis	DSC-9	To study analytic functions, Cauchy–Riemann equations,	Learners will be able to:

			complex integration, residues, and conformal mappings.	- Analyze analytic functions and harmonic functions. - Apply Cauchy's theorem, integral formula, and Laurent series. - Evaluate contour integrals using residue theorem. - Apply conformal mappings and bilinear transformations.
	Multivariate Calculus	DSC-10	To introduce functions of several variables, partial derivatives, multiple integrals, and vector calculus.	Learners will be able to: - Compute partial derivatives, Jacobians, and Taylor expansions. - Solve optimization problems with and without constraints. - Evaluate multiple integrals and apply vector calculus theorems.
VI	Partial Differential Equations	DSC-11	To study formation, classification, and solution of PDEs.	Learners will be able to: - Solve first-order PDEs using Lagrange, Charpit, and characteristic methods. - Solve linear PDEs with constant coefficients. - Analyze second-order PDEs and apply separation of variables.

Number Theory	DSC-12	To introduce divisibility, congruences, number theoretic functions, primitive roots, and quadratic residues.	Learners will be able to: - Apply Euclidean algorithm, congruences, and Chinese Remainder Theorem. - Analyze number theoretic functions and primitive roots. Solve quadratic congruences and study reciprocity laws
Computer Programming using C	DSC-13	To develop programming skills using C for mathematical computation.	Learners will be able to: - Write C programs using control structures, arrays, functions, and pointers. - Implement algorithms for mathematical and numerical problems.
Probability and Statistics	DSC-14	To introduce descriptive statistics, probability, random variables, and distributions.	Learners will be able to: - Analyze data using statistical measures. - Apply probability theorems and distributions. - Perform correlation, regression, and data interpretation.
Special Functions and Integral Transforms	DSC-15	To study Gamma/Beta functions, special polynomials, Laplace and Fourier transforms.	Learners will be able to: Apply special functions and orthogonal polynomials.

				Solve ODEs and PDEs using Laplace and Fourier transforms.
VII	Advanced Abstract Algebra	DSC-16	To study group actions, Sylow theorems, ring theory, polynomial rings, and field extensions.	Learners will be able to: - Apply group actions, class equation, and Sylow theorems. - Analyze ideals, factor rings, and homomorphisms.
	Mechanics and Hydrodynamics	DSC-17	To introduce statics, dynamics, SHM, hydrostatics, and fluid dynamics.	Learners will be able to: - Solve problems involving forces, moments, friction, and motion. - Apply energy, momentum, and SHM principles. - Analyze fluid motion using Euler's and Bernoulli's equations.
	Graph Theory	DSC-18	To study graphs, connectivity, trees, traversability, colorability, and planarity.	Learners will be able to: - Analyze graph structures, connectivity, and trees. - Apply algorithms for spanning trees and shortest paths. - Study matchings, colorings, and planar graphs.

VIII	Metric Space & Topology	DSC-19	To introduce metric spaces, topological spaces, continuity, compactness, and connectedness.	Learners will be able to: - Analyze metric spaces, open/closed sets, and convergence. - Study topological spaces, continuity, and homeomorphisms. - Apply compactness and connectedness concepts.
	Numerical Analysis	DSC-20	To study numerical methods for equations, interpolation, differentiation, integration, ODEs, and PDEs.	Learners will be able to: - Analyze numerical errors and convergence. - Apply interpolation, differentiation, and integration techniques. - Solve ODEs and PDEs using numerical methods.

10.4 Course Outcome-Programme Outcome (CO-PO) Mapping

In accordance with the principles of Outcome-Based Education (OBE), the Course Outcomes (COs) of each course in the B.Sc. Mathematics (Honours) programme are systematically mapped with the Programme Outcomes (POs). This mapping ensures that the learning objectives of individual courses contribute effectively to the attainment of the overall programme outcomes.

The CO-PO mapping matrix presented below indicates the degree of correlation between course outcomes and programme outcomes using a three-point scale, where 3 represents high correlation, 2 represents moderate correlation, 1 represents low correlation and blank space represents no significant correlation. This structured alignment facilitates continuous evaluation, quality assurance, and attainment analysis of programme objectives.

Table: Mapping of Courses with Programme Outcomes of B.Sc. Mathematics (Honours) programme

Course Name	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
DSC-1	Classical Algebra & Trigonometry	3	3	2	1	1	1	1	2	1	3
DSC-2	Calculus	3	3	3	1	2	2	1	2	1	3
DSC-3	Abstract Algebra & Discrete Mathematics	3	3	2	1	1	2	1	3	1	3
DSC-4	Ordinary Differential Equations	3	3	3	1	2	2	1	2	1	3
DSC-5	Analytical Geometry & Vector Calculus	3	3	3	1	3	2	1	2	1	3
DSC-6	Real Analysis	3	3	2	1	1	3	1	3	1	3
DSC-7	Linear Algebra	3	3	2	1	1	3	1	3	1	3
DSC-8	Operations Research	3	3	3	2	2	2	1	3	1	3
DSC-9	Complex Analysis	3	3	2	1	1	3	1	3	1	3
DSC-10	Multivariate Calculus	3	3	3	1	3	2	1	3	1	3
DSC-11	Partial Differential Equations	3	3	3	1	2	3	1	3	1	3
DSC-12	Number Theory	3	3	2	1	1	2	1	3	1	3
DSC-13	Computer Programming using C	2	2	3	3	1	2	2	2	1	3

DSC-14	Probability & Statistics	3	3	3	2	2	2	2	3	2	3
DSC-15	Special Functions & Integral Transforms	3	3	3	2	2	3	1	3	1	3
DSC-16	Advanced Abstract Algebra	3	3	2	1	1	3	1	3	1	3
DSC-17	Mechanics & Hydrodynamics	3	3	3	1	3	2	1	2	1	3
DSC-18	Graph Theory	3	3	3	2	1	2	1	3	1	3
DSC-19	Metric Space & Topology	3	3	2	1	1	3	1	3	1	3
DSC-20	Numerical Analysis	3	3	3	3	2	2	1	3	1	3

12. List of Annexures

Annexure I: Detailed Syllabus of the Four-Year Undergraduate Programme in Mathematics

Annexure II: Course wise (offered from the Discipline) faculty allotment of UG Programme in Mathematics

Annexure III: Guidelines for Seminar/Presentation of UG Programme in Mathematics

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Annexure V: Common Basket of Interdisciplinary Courses (IDC), Ability Enhancement Courses (AECs), Value Added Courses (VACs) and Skill Enhancement Courses (SECs)

Annexure I

Four Year Undergraduate Programme in Mathematics

Detailed Syllabi

SEMESTER I

Major 1: Classical Algebra & Trigonometry

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- provide learners the concept of theory of equations, relation between the roots and coefficients, and symmetric functions of the roots.
- enable learners to understand inequalities involving arithmetic, geometric and harmonic means.
- provide knowledge about determinants and matrices, along with their properties and operations.
- develop understanding of adjoint, inverse, rank of a matrix, and solution of linear equations using matrices and Cramer's rule.
- familiarize learners with eigenvalues, eigenvectors, Cayley–Hamilton theorem, De Moivre's theorem, and trigonometric and hyperbolic functions.

Course Outcomes: After successful completion of this course, learners will be able to:

- solve higher order algebraic equations.
- learn to solve system of linear equations.
- determine the rank of a matrix, eigenvalues, eigenvectors and Inverse of a matrix.
- employ De Moivre's theorem in a number of applications to solve numerical problems.
- learn about matrices, determinant and application in solving system of equations.
- sum the trigonometric series of real and complex numbers and separate the trigonometric function in form of $A + iB$.

UNIT-1: Theory of Equation-I:

Polynomial equations, Relation between roots and coefficients and related problems, Symmetric functions of roots

UNIT 2: Theory of equation-II:

Cardan's method of solution of cubic equation, Descartes' rule of sign, Cardan's Solution of the Standard cubic.

UNIT 3: Inequalities:

Definition, properties, Inequalities involving arithmetic, geometric and harmonic means

UNIT 4: Determinant:

Definition and examples, properties (without proof), problems on determinants (using properties).

UNIT-5: Matrices:

Definition of Matrix and Examples, Types of matrices, algebra of matrices: Addition of matrices, scalar multiplication, subtraction of matrices, multiplication of matrices.

UNIT-6: Adjoint and Inverse of a Matrix:

Transpose of a matrix, symmetric and skew-symmetric matrix, Adjoin and inverse of a matrix and its existence.

UNIT 7: Rank and Elementary Operations:

Definition of rank of a matrix, Elementary operations, Inverse Using Elementary operations.

UNIT 8: System of Linear Equations:

Solution of a system of linear equations by matrix method, Solution of a system of linear equations by Cramer's rule

UNIT 9: Eigenvalues and Eigenvectors:

Characteristic equation of a matrix, Characteristic matrix, Definition, properties of eigenvalues and eigenvectors, Statement and Verification of Cayley Hamilton Theorem, finding inverse using Cayley Hamilton Theorem

UNIT-10: De Moivre's theorem and its application:

Statement and proof, Important deductions from De Moivre's theorem, Extraction of roots of complex numbers, solution of equation.

UNIT-11: Expansion of Trigonometric function:

Expansion for cosine and sine.

UNIT 12: Hyperbolic function:

Definition & Examples, Relation between Hyperbolic Functions - Inverse Hyperbolic Functions.

UNIT 13: Logarithm of a complex number:

Definition, Examples, properties

UNIT 14: Trigonometric series:

Gregory Series and other related series, Summation of trigonometric series (when the angles are in A.P, $C + iS$ method, Method of differences)

Suggestive Readings:

1. Mapa, S. K. (2011). *Classical algebra* (8th ed.).
2. Vatsa, B. S. (2010). *Theory of matrices* (3rd ed.). New Age International Publishers.
3. Bali, N. P. (1985). *Trigonometry for B.A./B.Sc. classes* (1st ed.). Laxmi Publication (P) Ltd.
4. Kishan, H. (2005). *Trigonometry* (1st ed.). Atlantic Publishers.
5. Lipschutz, S. (2008). *Schaum's Outline of Linear Algebra* (4th ed.). Tata McGraw-Hill.

SEMESTER II
Major 2: Calculus

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- introduce the basic concepts of functions, limits, continuity, and differentiability as the foundation of differential calculus.
- develop an understanding of differentiation and its rules, including successive differentiation and higher-order derivatives.
- explain the concept of partial differentiation and its applications to maxima and minima of functions of two variables.
- enable learners to evaluate limits involving indeterminate forms using appropriate techniques.
- provide knowledge of applications of derivatives, including tangents, normals, curvature, increasing and decreasing functions, and optimization problems.
- introduce the Mean Value Theorems and their significance in mathematical analysis.
- develop a clear understanding of integral calculus, including indefinite and definite integrals and their properties.
- familiarize learners with methods of integration and reduction formulae.
- apply calculus techniques to geometrical problems, such as areas, lengths of curves, volumes, and surface areas of solids of revolution.

Course Outcomes: After successful completion of this course, learners will be able to:

- understand and apply the concepts of functions, limits, continuity, and differentiability to solve mathematical problems.
- compute derivatives of standard functions using various differentiation rules, including product, quotient, logarithmic, and parametric differentiation.
- evaluate limits involving indeterminate forms using L'Hospital's Rule.
- apply Leibnitz's rule to obtain higher-order derivatives of functions.
- analyze the increasing and decreasing nature of functions and apply first and second derivative tests to determine relative maxima and minima.
- solve problems related to tangents, normals, and curvature of curves.
- identify and apply Rolle's Theorem, Lagrange's Mean Value Theorem, and Cauchy's Mean Value Theorem.
- compute partial derivatives and apply Euler's theorem on homogeneous functions.

- determine extreme values of functions of two variables and solve constrained optimization problems using the method of Lagrange multipliers.
- evaluate indefinite and definite integrals using standard methods and properties.
- apply integral calculus to find areas of plane regions, lengths of plane curves, and volumes and surface areas of solids of revolution.

UNIT-1: Function:

Function, Domain and range of a function, Classification of a function, Concept of limit of a function, Continuity of a function at a point, Concept of Derivative

UNIT-2: Derivative of a functions:

Derivative of various standard function, Derivative of sum and difference of functions, Derivative of product of functions and Quotient rule, Derivative of composite functions, Derivative of logarithmic functions and Implicit functions,

UNIT- 3: Indeterminate forms:

Definition, L Hospital's Rules, Forms $\frac{0}{0}, \frac{\infty}{\infty}, 0 \cdot \infty, \infty - \infty, 0^0, 1^\infty, \infty^0$

UNIT-4: Successive differentiation:

Leibnitz's theorem for the nth derivative of the product of two functions.

UNIT-5: Application of derivatives:

Increasing and Decreasing of a function, Derivatives as rate measurer, Maximum and minimum of a function, Curvature, tangent and normal.

UNIT-6: Mean Value theorem:

Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem.

UNIT-7: Function of several variables:

Partial Derivatives, homogeneous function, Euler's theorem on homogeneous function.

UNIT-8: Extreme value of a function of several variables:

Maximum and minimum of a function of two variables, Definition, Examples, Application.

UNIT -9: Jacobians and Lagrange method of undetermined multipliers:

Definition, its properties, Statement, Application

UNIT-10: Integration and Methods of Integration:

Introduction, Integration of simple functions, Properties of Integrals, Methods of integration: Integration by substitution, Integration by parts, Integration by Partial fraction.

UNIT 11: Definite integrals:

Definition, Fundamental properties of definite integrals, Evaluation of definite integrals by using properties only.

UNIT-12: Reduction formulae:

Derivations of some reduction formulae of the type:

$$\int \sin^n x dx, \int \cos^n x dx, \int \tan^n x dx, \int \sec^n x dx, \int (\log x)^n dx, \int \sin^n x \cos^m x dx$$

UNIT 13: Quadrature of plane areas:

Definition, Areas in Cartesian coordinates, Areas bounded by two curves.

UNIT-14: Rectification of plane curves:

Definition, Formula for Cartesian equation

UNIT-15: Volume of revolution and surface of revolution:

Volume of revolution about x-axis, Area of the curved surface of a solid of revolution about x-axis.

Suggestive Readings:

1. Narayan, S., & Mittal, P. K. (2014). *Differential calculus*. S. Chand & Company Pvt. Ltd. (Reprint)
2. Narayanan, S., & Manicavachagom Pillay, T. K. (2009). *Calculus* (Vols. I & II). S. Viswanathan Pvt. Ltd.
3. Ayres, F., & Mendelson, E. (2008). *Schaum's outline of calculus* (5th ed.). McGraw-Hill Education.
4. Narayan, S., & Mittal, P. K. (2013). *Integral calculus*. S. Chand & Company Pvt. Ltd. (Reprint)

SEMESTER III
Major 3: Abstract Algebra & Discrete Mathematics

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- provide learners the fundamental concepts of relations, functions, and binary operations and their types.
- develop understanding of groups, subgroups, cosets, and normal subgroups along with their properties and examples.
- familiarize learners with rings, integral domains, and fields, and their algebraic structures.
- introduce the concepts of vector spaces, including subspaces, basis, and dimension.
- enable learners to apply the principles of combinatorics, mathematical logic, and Boolean algebra in solving logical and algebraic problems.

Course Outcomes: After successful completion of this course, learners will be able to:

- understand the basic concepts of relations and functions
- gets a concept of group, ring, Integral domain and vector space and their properties
- learn about Lagrange's theorem.
- know about group homomorphisms and group isomorphisms
- know the basic concepts of discrete mathematics.

UNIT 1: Relations & Functions:

Relations and Types of relations, equivalence relation, function and types of function.

UNIT 2: Binary Operation:

Definition, Types of binary operation

UNIT 3: Group:

Definitions and Examples of groups, Properties of groups

UNIT 4: Subgroups:

Definition, Examples, Properties, cyclic groups,

UNIT 5: Group of permutation:

Definition of permutation, different kinds of permutation, permutation group.

UNIT 6: Cosets:

Definition, properties of cosets, Lagrange's Theorem

UNIT 7: Normal subgroups & Quotient groups:

Definition and Examples, properties.

UNIT 8: Homomorphism of groups:

Definition and Examples, Properties of Homomorphism

UNIT 9: Ring:

Definitions and Examples of Rings, Properties of Ring

UNIT 10: Integral domain & Field:

Definition and Examples, Properties.

UNIT 11: Vector Space:

Definition and Examples, Subspace, Properties, Linear dependence and Independence, Basis and Dimension.

UNIT 12: Combinatorics:

The rules of sum and product, permutations, combinations.

UNIT 13: Mathematical Logic:

Propositions and Logical connectives, Truth table, construction of truth tables, tautologies and contradictions, Equivalence and Implication.

UNIT 14: Boolean Algebra:

Definition, Basic Boolean algebra Laws, Boolean expression.

Suggestive Readings:

1. Khanna, V. K., & Bhambri, S. K. (2019). *A course in abstract algebra*. Vikas Publishing House Pvt. Ltd.
2. Herstein, I. N. (1975). *Topics in algebra* (2nd ed.). Wiley Eastern Ltd./Wiley.
3. Mapa, S. K. (1994). *Higher algebra (abstract and linear)*. Ashok Prakashan.
4. Singh, S., & Zameeruddin, Q. (2021). *Modern algebra* (9th ed.). Vikas Publishing House Pvt. Ltd.

5. Gallian, J. A. (2012). *Contemporary abstract algebra* (8th ed.). Brooks/Cole; Cengage Learning.
6. Sharma, J. K. (n.d.). *Discrete mathematics*. Macmillan Publishing India Ltd

Major 4: Ordinary Differential Equations

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The objectives of this course are to enable learners to:

- Understand the basic concepts of ordinary differential equations (ODEs), including their formation, order, degree, and classification.
- Learn methods for solving higher-order linear differential equations with constant and variable coefficients.
- Apply techniques such as the operator method, method of undetermined coefficients, and variation of parameters to obtain solutions of non-homogeneous differential equations.
- Study special types of differential equations, including Cauchy–Euler equations and simultaneous differential equations.
- Introduce series solutions of differential equations using power series and the Frobenius method.
- Understand the concepts of existence, uniqueness, linear independence of solutions, and the role of the Wronskian.

Course Outcomes: After successful completion of this course, learners will be able to:

- Identify and classify ordinary differential equations by determining their order, degree, and type (linear or non-linear).
- Solve first-order and first-degree differential equations using methods such as variable separable, homogeneous, exact, and linear equations.
- Solve first-order differential equations of higher degree, including equations solvable for x , y , or p , and Clairaut's form.
- Obtain general solutions of higher-order linear differential equations and apply appropriate initial and boundary conditions.
- Solve linear differential equations with constant coefficients using the complementary function and particular integral.
- Use the method of undetermined coefficients and variation of parameters to find particular solutions of non-homogeneous differential equations.
- Solve Cauchy–Euler differential equations and reduce suitable equations to constant-coefficient form.

- Solve simultaneous linear differential equations using elimination and operator methods.
- Obtain series solutions of differential equations using power series and the Frobenius method near ordinary and singular points.
- Analyze existence and uniqueness of solutions using Lipschitz conditions, Picard's method, and related theorems.
- Determine linear dependence and independence of solutions using the Wronskian and study orthogonality of functions.
- solve first order non-linear differential equations and linear differential equations of higher order using various techniques.

UNIT 1: Introduction to Ordinary Differential Equations:

Definition and Examples, Order and degree of ordinary differential equation, Linear and non-linear differential equation, Formation of a differential equation.

Unit 2: Differential Equations of First order and First Degree

Variable Separable Method, Homogeneous Differential Equation.

Unit 3: Exact Differential Equation of first order and first degree

Exact differential Equations, Equation reducible to exact equations

Unit 4: Linear Differential Equations of First Order

Linear differential equations, Integrating Factor, Bernoulli's equation, Equations reducible to linear form, Applications

UNIT 5: First order and higher degree differential equation:

First order higher degree equations solvable for x , y and p , Clairaut's form.

UNIT 6: Linear differential equation of higher order:

Higher order differential equations, Homogeneous linear differential equations, Complementary function, Particular integral.

UNIT 7: Cauchy–Euler Differential Equations

Cauchy-Euler equations, Homogeneous and non-homogeneous cases, Method of solution.

UNIT 8: Second Order Linear Differential Equation

Linear differential equation of second order, General solution for homogeneous equation, Complete solution of the linear equation of second order, Removal of the first derivative (Reduction to normal form), Transformation of the equation by changing independent variables.

UNIT 9: Methods of Finding Particular Integrals: Variation of Parameters and Method of Undetermined Coefficients

Non-Homogeneous linear differential equations, Method of variation of parameters, Method of undetermined coefficients.

UNIT 10: Simultaneous Differential Equations:

Simultaneous linear differential equations, Solution of simultaneous linear differential equation, Simultaneous equation of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

UNIT 11: Series Solutions of Differential Equations

Power series method, Ordinary and singular points, Frobenius method and Indicial equation

UNIT 12: Applications of First-Order Differential Equations

Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay, Geometrical and physical applications

UNIT 13: Existence and Uniqueness

Well posed problems, Lipschitz condition, existence and uniqueness theorem for first order equations. Picard's method, Initial value problems for second order equations, existence theorem, uniqueness theorem, linear dependence and independence of solutions, Wronskian

UNIT 14: Orthogonality and Independence in ODES

Orthogonality of functions, Orthonormal set of functions, Singular solutions of first order ODEs

Suggestive Readings:

1. Ross, S. L. (1984). *Differential equations* (3rd ed.). John Wiley & Sons.
2. Simmons, G. F. (2017). *Differential equations with applications and historical notes* (3rd ed.). Chapman & Hall / CRC Press.
3. Raisinghania, M. D. (2020). *Ordinary and partial differential equations* (20th ed.). S. Chand & Company Ltd.
4. Sharma, A. K. (2004). *Advanced differential equations*. Discovery Publishing House

SEMESTER IV

Major 5: Analytical Geometry and Vector Calculus

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- find the direction cosines and cross product of two vectors in space
- find the distance between points, planes, and lines in space
- perform vector operations and interpret the results geometrically
- find the angle between two vectors using the dot product
- use the triple scalar product of three vectors in space

Course Outcomes: After successful completion of this course, learners will be able to:

- understand the distance between points, the distance from a point to a line, and the distance from a point to a plane in the three-dimensional coordinate system
- compute dot and cross product of vectors
- compute scalar and vector projections of a vector onto another and the angle between two vectors.
- understand the equations and geometric properties of straight lines, circles, conic sections, and three-dimensional figures like planes, spheres, and cylinders.
- compute vector operations and apply vector calculus concepts such as gradient, divergence, and curl to solve geometrical and physical problems.

UNIT 1: Introduction of straight lines:

Slope of a line, Various standard forms of equation of straight lines.

UNIT 2: Transformation of coordinate axes:

Translation and rotation, Related theories and problems.

UNIT 3: Pair of straight lines:

Pair of straight lines through origin, Angle and Bisectors of the angle between the lines given by homogenous equation of 2nd degree, Condition for the general

equation of second degree to represent a pair of straight lines, Pair of intersecting straight lines, Pair of parallel straight lines.

UNIT 4: Circle:

Second degree equation of a circle, Equation of a circle when end points of its diameter is given, tangent and normal

UNIT 5: Conic sections:

Parabola and its standard equation, Ellipse and its standard equation, hyperbola and its standard equation, Polar forms, Conjugate Hyperbola, Conjugate Diameter for Ellipse and Hyperbola.

UNIT 6: Introduction of co-ordinate in three dimensions:

Coordinate axes, Direction cosine of a line, direction ratio of a line

UNIT 7: The Plane:

Equation of a plane, Various forms of the equation of a plane

UNIT 8: The straight line:

The straight line, The shortest distance (S.D) between two lines

UNIT 9: Sphere:

Definition and General equation of Sphere.

UNIT 10: Cone:

Definition and General equation of Cone.

UNIT 11: Cylinder:

Definition and General equation of Cylinder.

UNIT 12: Introduction to Vectors:

Classification of vectors, Algebra of vectors: Addition of vectors, subtraction of vectors, Multiplication vectors by scalars.

UNIT 13: Product of Vectors-I

Product of Two Vectors: Scalar or Dot Product, Vector (Cross) Product

UNIT 14: Product of Vectors-II

Product of Three Vectors, Scalar Triple Product, Vector Triple Product, Product of Four Vectors, Scalar Product of Four Vectors, Vector Product of Four Vectors

UNIT 14: Vector Calculus:

Scalar and Vector point function, Vector differential operator (∇), Gradient, divergence and Curl and their Identities, Laplacian operator.

Suggestive Readings:

1. Khan, R. M. (2005). *Analytical geometry of two and three dimensions and vector analysis*. New Central Book Agency (P) Ltd.
2. Kishan, H. (2004). *Coordinate geometry of two dimensions*. Atlantic Publishers & Distributors.
3. Kishan, H. (2006). *Vector algebra and calculus*. Atlantic Publishers & Distributors (P) Ltd.
4. Sharma, A. K. (2003). *Coordinate geometry (2D)*. Discovery Publishing House.
5. Sharma, A. K. (2004). *Textbook of vector calculus*. Discovery Publishing House.
6. Vasishta, A. R., & Agrawal, D. C. (2002). *Analytical geometry of three dimensions (coordinate solid geometry)*. Krishna Prakashan Media.

Major 6: Real Analysis

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- define functions between sets; equivalent sets; finite, countable and uncountable sets.
- Recognize convergent, divergent, bounded, Cauchy and monotone sequences.
- define sequences and identify the different kinds of sequences.
- understand the properties of real numbers, open/closed sets, and limit points in real analysis.
- analyze convergence of sequences, series, and functions using appropriate tests and criteria.

Course Outcomes: After successful completion of this course, learners will be able to:

- understand concept of sequences, series and its various types with examples.
- understand the types of tests with examples.

- understand the fundamental properties of the real numbers, including completeness and Archimedean, and density property of rational numbers in $\mathbb{R}$.
- recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate the limit superior and limit inferior of a bounded sequence.
- understand how the elementary functions can be defined by power series, with an ability to deduce some of their easier properties.
- learn the concept of Convergence and Divergence of a sequence

UNIT 1: Sets and Functions:

Sets, Equality of sets, Different kinds of sets, Algebraic operations on sets, Functions, Real valued functions of a real variable,

UNIT 2: Real number System-I:

Natural numbers, Integers, Rational numbers, Real numbers, The real line

UNIT 3: Real number System-II:

Order properties of $\mathbb{R}$, Intervals, Extended set of real numbers, Absolute value of a real number, Archimedean property of $\mathbb{R}$, Density property of $\mathbb{R}$,

UNIT 4: Real number System-III:

Bounded and unbounded sets in Supremum and infimum, Completeness property of $\mathbb{R}$.

UNIT 5: Countability of sets:

Equivalent sets, Denumerable sets, Countable sets, Uncountable sets, Countability of rational numbers, Countability of real numbers

UNIT 6: Limit point of a set: Open and Closed sets:

Neighbourhood of a point, properties of neighbourhood, Interior point of a set, limit point of a set, open sets, closed sets

UNIT 7: Real Sequences-I:

Definition, Range of a sequence, Finite and Infinite Sequences, Bounded and unbounded sequence, Convergent sequence, Divergent sequence, Oscillatory sequence, Monotonic sequence, Limit of a Sequence, Basic Theorems of Convergence of Monotonic Sequences.

UNIT 8: Real Sequences-II:

Cauchy's Sequence, Cauchy's general principle of Convergence, Supremum of a sequence, Infimum of a sequence, Limit superior and limit inferior of Sequence.

UNIT 9: Infinite Series-I:

Introduction, Convergent, divergent and oscillatory series, Cauchy's general principle of convergence of series.

UNIT 10: Infinite Series-II:

Comparison tests for series of positive terms, The p-test for the series of the type $\sum (\frac{1}{n^p})$. D'Alembert's ratio test, Raabe's Test, Logarithmic Test, Cauchy's root test

UNIT 11: Power Series:

Introduction, Convergence of power series, Interval of convergence, Radius of convergence, working rule for finding radius of convergence and interval of convergence.

Unit 12: Sequence of Functions:

Sequence of real valued functions, Pointwise convergence of a sequence of functions, Uniform convergence of functions, Uniform bounded functions of sequence, Cauchy's criterion for uniform convergence

Unit 13: Series of real valued function:

Introduction, Pointwise convergence of a series of functions, Uniform convergence of series of functions, Cauchy's criterion for uniform convergence of a series of functions

Unit 14: Tests for Uniform convergence of series of functions:

Weierstrass' M Test for uniform convergence, Abel's test and Dirichlet's test

Suggestive Readings:

1. Bartle, R. G., & Sherbert, D. R. (2011). *Introduction to real analysis* (4th ed.). John Wiley & Sons.
2. Malik, S. C., & Arora, S. (2012). *Mathematical analysis*. New Age International Pvt. Ltd.
3. Narayana, S., & Raisinghania, M. D. (2010). *Elements of real analysis*. S. Chand & Company Ltd.
4. Berberian, S. K. (1994). *A first course in real analysis*. Springer-Verlag.

Major 7: Linear Algebra

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand the fundamental concepts of vector spaces, subspaces, linear dependence, basis, and dimension of vector spaces.
- study linear transformations, linear operators, matrix representations, and the rank-nullity theorem.
- explore inner product spaces, orthogonality, Gram-Schmidt process, and self-adjoint operators.
- analyze eigenvalues, eigenvectors, canonical forms (Jordan, Rational) and their applications.
- learn about dual spaces, linear functionals, bilinear forms, and quadratic forms in advanced linear algebra.

Course Outcomes: After successful completion of this course, learners will be able to:

- learn about eigenvalues and eigenvectors of a linear operator and a matrix, learn about the diagonalization of a matrix and find the Jordan canonical form of a matrix.
- describe the concepts of the term's basis, dimension, and apply these concepts to various vector spaces and subspaces.
- use the concept of linear transformations, matrix representation and change of basis, including kernel, range.
- understand the notion of bilinear forms, triangularization and primary decomposition theorem
- compute inner products and determine orthogonality on vector spaces, applying Gram-Schmidt orthogonalization process to find the orthonormal basis.

Unit 1: Vector Spaces –I

Vector space: Definition and examples, General properties of vector spaces, Vector Subspace, Algebra of subspaces

Unit 2: Vector Spaces -II

Linear combination, of vectors, Linear span, Linear Sum of two subspaces, Direct Sum, Disjoint subspaces, Complimentary subspaces, Quotient space

Unit 3: Linear Dependence

Zero vector, operations on vectors, Vectors in C^n , Vectors in R^n , Unit vector, Orthogonality of two vectors, Linear dependence of vector, Linear independence of vector

Unit 4: Basis and Dimension

Basis, finitely generated spaces, Dimension of vector space, Rank of a matrix, Existence theorem, Dimension of Quotient space, Dimension of direct sum

Unit 5: Linear Transformations

Transformation, Linear transformation, Linear operator, Isomorphism, Range and null space of linear transformation, Rank and nullity of a linear transformation, Invertible transformations, Singular and non-singular transformation

Unit 6: Matrix Representation of a linear transformation

Co-ordinate vector, Matrix representation of a transformation, Matrix representation of a linear operator, Change of Basis, Similar matrices, Determination of a linear transformation, Similarity of linear map

Unit 7: Rank-Nullity Theorem

Statement and proof, Applications, Relation between rank, nullity, and dimension, Examples

Unit 8: Eigenvalues and Eigenvectors

Polynomial of matrices and linear operators, Eigenvalue and Eigenvector, Matrix Polynomial, Characteristic subspace of a matrix, Eigenspace

Unit 9: Linear Functionals and the dual spaces

Linear functional, Dual space, Dual basis, Natural mapping and Reflexivity, Transpose of a linear map, Annihilator, Adjoint of an operator

Unit 10: Bilinear forms and Quadratic forms

Bilinear form, Symmetric form, Antisymmetric form, Quadratic matrix, Quadratic forms, Matrix representation of bilinear form

Unit 11: Projection and Invariance

Idempotent and Nilpotent operators, Invariance, Reducibility, Projection

Unit 12: Canonical Form-I

Diagonal Form, Triangular Form, Nilpotent Transformation

Unit 13: Canonical Form-II

Jordan Canonical Form, Rational Canonical Form

Unit 14: Inner Product Spaces

Inner product, Norm, Orthogonality, Angle, Normed vector space, Complete orthonormal set, Self-adjoint operator, Bessel's inequality, Gram Schmidt orthogonalization process

Suggested Readings:

1. Lay, D. C., & Kunze, R. A. (2015). *Linear algebra* (2nd ed.). Pearson India.
2. Axler, S. (2014). *Linear algebra done right* (2nd ed.). Springer-Verlag.
3. Lang, S. (2013). *Linear algebra* (3rd ed.). Springer-Verlag.
4. Lipschutz, S., & Lipson, M. (2005). *Linear algebra* (3rd ed.). Tata McGraw-Hill.
5. Friedberg, S. H., Insel, A. J., & Spence, L. E. (2002). *Linear algebra* (4th ed.). Pearson Education.

SEMESTER V

Major 8: Operations Research

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- formulate and model a linear programming problem from a word problem and solve them graphically in 2 and 3 dimensions
- formulate and solve a number of problems in game theory using various methods.
- understand the origin, nature, features, and applications of Operations Research along with modeling techniques and their limitations.
- learn formulation and solution methods for Linear Programming Problems using Simplex Method, Big-M Method, and Duality concepts.
- study Transportation problem, Assignment problem, Game Theory, Sequencing, PERT/CPM, and basic Non-linear Programming techniques.

Course Outcomes: After successful completion of this course, learners will be able to:

- understand the concept of operations research methods and its uses in various fields.
- learn about the graphical solution of linear programming problem with two variables
- learn about the relation between basic feasible solutions and extreme points
- understand the theory of the simplex method used to solve linear programming problems.
- learn about the relationships between the primal and dual problems
- solve transportation and assignment problems

UNIT 1: Introduction to operations research I:

Origin and Development of Operations Research (OR), Nature and Features of Operations Research, Scientific Method in OR, Application of OR, Opportunities and Shortcomings in OR

UNIT 2: Introduction to operations research II:

Modelling in OR, Classification of Models, Advantages and Limitations of Models, General solution methods to OR models.

UNIT 3: Linear programming problem (LPP):

Linear programming problem (LPP), General form of Linear programming problem (LPP), Some important definitions, Basic assumption of LPP, Application of LPP, Limitations of LPP, Mathematical formulation of a LPP

UNIT 4: Graphical method of solution for LPP:

Some basic definition, Graphical methods to solve LPP, Some special cases, Limitations of graphical method

UNIT 5: Simplex Method-I:

Standard Form of Linear Programming Problem (LPP), General LPP, Canonical and Standard Forms of LPP, Solution of LPP, Fundamental Theorem of LPP,

UNIT 6: Simplex Method-II:

Simplex Algorithm, Big-M Method, Two-Phase Method

UNIT 7: Duality in Linear programming problem:

Importance of Duality Concepts, Formulation of Dual Problem, Economic Interpretation of Duality, Sensitivity Analysis

UNIT 8: Transportation Problem-I:

Formulation of Transportation Problem (TP), Basic Theorems on TP, Initial Basic Feasible Solution: North-West Corner Method, Matrix-Minima Method, Vogel Approximation Method

UNIT 9: Transportation Problem-II:

Optimality Test, Algorithm of MODI Method

UNIT 10: Assignment Problem:

Formulation of an Assignment Problem, Assignment Problem as a Special Case of Transportation Problem, Solution of an Assignment Problem, The Hungarian Method of Solution of an Assignment Problem, The Travelling Salesman Problem (Shortest Cyclic Route Model)

UNIT 11: Game theory:

Competitive Situations, Characteristics of Competitive Games, Two-Person Game, Problem, Two-Person Zero-Sum Game, Pay-off Matrix, Strategy, Maximin and Minimax Principle, Saddle Point, Value of a Game, and Symmetric Game, Dominance Property

Unit 12: Project Scheduling and PERT, CPM:

Project, Project planning, Project Scheduling Network and its basic components, Procedure relationship, CPM, PERT, Basic difference between PERT and CPM

Unit 13: Sequencing:

Definition and examples, Johnson's algorithm, Three machine problem, Processing of two jobs on 'n' machines

Unit 14: Non-linear Programming:

Formulation of a non-linear programming problem (NLPP), General non-linear programming problem, Constrained optimization with equality constraints, Constrained optimization with inequality constraints, Saddle point problems, Saddle points and NLPP

Suggestive Readings:

1. Swarup, K., Gupta, P. K., & Mohan, M. (2014). *Operations research*. Sultan Chand & Sons.
2. Gupta, P. K., Hira, D. S. (2014). *Operations research*. S. Chand & Company Ltd.
3. Sanyal, D. C., & Das, K. (2008). *Linear programming and game theory*. U. N. Dhur & Sons Private Ltd.
4. Panneerselvam, R. (2006). *Operations research*. Prentice Hall of India Private Limited.

Major 9: Complex Analysis

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand functions of a complex variable, analytic functions, and Cauchy-Riemann equations along with their polar forms.
- study complex integration, Cauchy's integral formula, Cauchy-Goursat theorem, and higher-order derivatives.
- learn Taylor and Laurent series, power series convergence, and conformal transformations including bilinear transformations.
- explore singularities, poles, residues, and Cauchy's residue theorem for evaluating contour integrals.
- apply residue calculus for improper integrals and use argument principle and Rouché's theorem.

Course Outcomes: After successful completion of this course, learners will be able to:

- understand analytic function as a mapping on the plane, Möbius transformation and branch of logarithm.
- understand Cauchy's theorems and integral formulas on open subsets of the plane.
- understand how to count the number of zeros of analytic function giving rise to open mapping theorem and Goursat theorem as a converse of Cauchy's theorem.
- know about the kind of singularities of meromorphic functions which helps in residue theory and contour integrations.
- handle integration of meromorphic function with zeros and poles leading to the argument principle and Rouché's theorem.
- analyze the concept of differentiability, analyticity, Cauchy-Riemann equations and harmonic functions.
- understand the concept of bilinear transformation and conformal mapping.

Unit 1: Functions of a complex variable

Functions of a complex number, Continuity and differentiability of complex function

Unit 2: Analytic Functions

Analytical function, Conjugate function, Harmonic function,

Unit 3: Cauchy -Riemann Equations

Cauchy-Riemann equations, Polar form of Cauchy-Riemann equations, Construction of analytical functions

Unit 4: Power Series

Power series, Absolute Convergence, Some special tests for convergence of power series, Radius of convergence of power series

Unit 5: Conformal Representation

Definitions and examples of Conformal transformation, Some general transformation, Bilinear transformations, their properties and classifications

Unit 6: Complex integration

Definite integrals, Contours, Contour integrals, Antiderivative, Cauchy-Goursat theorem

Unit 7: Cauchy Integral Formula

Cauchy's integral formula, Extended Cauchy integral formula, Higher order derivatives in the context of Cauchy's Formula

Unit 8: Liouville's Theorem and Fundamental Theorem of Algebra

Liouville's theorem, The fundamental theorem of algebra

Unit 9: Taylor and Laurent Series

Taylor series, Laurent series

Unit 10: Zeros and Singular point

Zeros of Analytical functions, Singular points, Different types of singular point

Unit 11: Poles and Singularities

Poles, Singularities, Types of singularities

Unit 12: The calculus of Residue

Residue, Cauchy's residue theorem, Residue at infinity, Residue at poles, Zeros and poles

Unit 13: Application of Residues-I

Evaluation of improper integrals, Integrals involving sines and cosines

Unit 14: Application of Residues-II

Argument principle, Rouché's theorem

Suggested Readings:

1. Brown, J. W., & Churchill, R. V. (2009). *Complex variables and applications* (8th ed.). Tata McGraw-Hill Education.

2. Ponnusamy, S. (2005). *Foundations of complex analysis*. Alpha Science International.
3. Ahlfors, L. V. (2017). *Complex analysis* (Indian ed.). McGraw-Hill Education.
4. Spiegel, M. R. (2017). *Complex variables* (2nd ed.). Schaum's Outline Series. McGraw-Hill Education.

Major 10: Multivariate Calculus

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- develop an understanding of functions of several variables, including limits, continuity, partial derivatives, and their geometrical interpretation.
- equip with techniques for analyzing multivariable functions, including total differentials, extrema, and constrained optimization using Lagrange multipliers.
- introduce multiple integrals and vector calculus, along with their applications to physical and geometrical problems.
- familiarize students with the fundamental theorems of vector calculus and prepare them for advanced studies in mathematics and allied disciplines.

Course Outcomes: After successful completion of this course, the learner will able to

- analyze functions of several variables by evaluating limits, continuity, and partial derivatives.
- apply techniques of total differentiation and optimization to solve problems involving maxima, minima, and constrained extrema.
- evaluate double and triple integrals and apply them to compute areas, volumes, and related physical quantities.
- use vector calculus tools, including line, surface, and volume integrals, to model and solve geometrical and physical problems.
- apply Green's, Gauss's, and Stokes' theorems to establish relationships between integrals and solve practical problems.

Unit 1: Functions of Several Variables

Definition and examples of functions of two and three variables, domain and range, graphs of multivariable functions, level sets, limits and continuity of functions of several variables

Unit 2: Partial Derivatives

Partial derivatives and higher-order partial derivatives, equality of mixed partial derivatives (Clairaut's theorem), total differential, differentiability of multivariable functions.

Unit 3: Chain Rule and Implicit Differentiation

Chain rule for functions of several variables, total derivative, implicit function theorem, Jacobians and their properties, functional dependence and independence.

Unit 4: Taylor's Theorem and Approximations

Taylor and Maclaurin series for functions of two variables, Taylor polynomial, approximation of functions

Unit 5: Maxima and Minima of Functions of Several Variables

Critical points, local and global extrema, second derivative test, Hessian matrix, saddle points, optimization problems, constrained extrema using Lagrange multipliers

Unit 6: Multiple Integrals

Double and triple integrals, iterated integrals, change of order of integration, evaluation of multiple integrals over rectangular and general regions

Unit 7: Change of Variables and Jacobians

Transformation of variables in double and triple integrals, Jacobian determinant, polar, cylindrical, and spherical coordinate transformations, applications to area and volume calculations.

Unit 8: Applications of Multiple Integrals

Area of plane regions, volume of solids, mass and density distributions, center of mass, moments of inertia

Unit 9: Vector Differentiation

Vector-valued functions, limits and continuity, differentiation

Unit 10: Vector Integration

Integration of vector functions, tangent and normal vectors

Unit 11: Vector Fields

Scalar and vector fields, gradient, directional derivative, divergence and curl, physical interpretation, conservative fields, potential functions.

Unit 12: Line Integrals

Line integrals of scalar and vector fields, independence of path, Applications of line integrals: Mass and Work, Fundamental theorem for line integrals, Green's theorem

Unit 13: Surface Integrals

Surface integrals, flux integrals

Unit 14: Integral Theorems of Vector Calculus

Gauss (Divergence) theorem, Stokes' theorem

Suggested Readings:

1. Thomas, G. B., & Finney, R. L. (2005). *Calculus* (9th ed.). Pearson Education.
2. Stewart, J. (2001). *Multivariable calculus: Concepts and contexts* (2nd ed.). Brooks/Cole, Thomson Learning.
3. Strauss, M. J., Bradley, G. L., & Smith, K. J. (2007). *Calculus* (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). (Indian reprint, 2011)

Major 11: Partial Differential Equations

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand the origin, formation, and classification of partial differential equations, including linear, non-linear, and first-order PDEs.
- study solution methods for first-order PDEs using Lagrange's method, Charpit's method, Cauchy's characteristics, and Jacobi's method.
- learn homogeneous and non-homogeneous linear PDEs with constant coefficients, including complementary functions and particular integrals.
- analyze second-order PDEs, their classification, canonical forms, and separation of variables techniques.

- explore standard PDE types—elliptic (Laplace, Poisson), parabolic (heat equation), and hyperbolic (wave equation)—with their applications.

Course Outcomes: After successful completion of this course, the learner will be able to

- solve first-order linear and nonlinear PDEs using Lagrange's method, Charpit's method, and Cauchy's method of characteristics.
- find complete, singular, and general integrals of first-order nonlinear partial differential equations.
- determine solutions of homogeneous and non-homogeneous linear PDEs with constant coefficients using complementary function and particular integral methods.
- classify second-order PDEs and reduce them to canonical forms through separation of variables.
- analyze elliptic, parabolic, and hyperbolic PDEs including Laplace, Poisson, heat, and wave equations with their standard solutions.

UNIT 1: Origin of Partial Differential Equations

Definition, Order and Degree of a PDE, Linear and non-linear PDE, Classification of first order PDEs, Origin of partial differential equations, Derivation of PDEs by the elimination of arbitrary constants, Derivation of PDEs by the elimination of arbitrary functions

UNIT 2: First order Linear PDE-I

Lagrange's equations, Lagrange's method of solving $Pp + Qq = R$

UNIT 3: First order Linear PDE-II

Integral surfaces passing through a given curve, The Cauchy Problem for first order equations, Surfaces orthogonal to a given system of surfaces

UNIT 4: First order Nonlinear PDE-I

Complete integral (or complete solution), particular integral, singular integral (or singular solution), general integral (or general solution)

UNIT 5: First Order Nonlinear PDE-II

Compatible system of first-order equations, Cauchy's method of characteristics, Charpit's method, some standard.

UNIT 6: Homogeneous linear PDE with constant coefficients

Solution of a homogeneous linear partial differential equation with constant coefficients, Method of finding the complementary function (C.F.), a general method of finding the P.I. of linear homogeneous PDE with constant coefficients.

UNIT 7: Non-homogeneous linear PDE with constant coefficients-I

Non-homogeneous linear PDE with constant coefficients, Reducible and irreducible linear PDEs with constant coefficients, Determination of complementary function (C.F) of a reducible non homogeneous linear PDE with constant coefficients.

UNIT 8: Non-homogeneous linear PDE with constant coefficients-II

Method of finding C.F. of irreducible linear PDE with constant coefficients, General solution of non-homogeneous linear PDEs with constant coefficients, Particular integral (P.I.) of non-homogeneous linear PDEs, Determination of P.I. of non-homogeneous linear PDEs.

UNIT 9: Partial Differential Equations of the Second Order

The Origin of Second -order Equations, Classification of partial differential equation of second order, Cauchy's problem of second order partial differential equations.

UNIT 10: Canonical form and separation of variables for first order PDE

Canonical form for first order PDE, separation of variables for first order PDE.

UNIT 11: Reduction to canonical or normal form for second order PDE

Canonical form for second order PDE, separation of variables for second order PDE.

UNIT 12: Elliptic Differential Equations

Elliptic differential equations, Occurrence and detailed study of the Laplace and the Poisson equation

UNIT 13: Parabolic Differential Equations

Parabolic differential equations, occurrence and detailed study of the heat equation

UNIT 14: Hyperbolic Differential Equations

Hyperbolic differential equations, Occurrence and detailed study of the wave equation, D'Alembert's solution for wave equation

Suggestive Readings:

1. Raisinghania, M. D. (2020). *Ordinary and partial differential equations*. S. Chand & Company Ltd.
2. Sharma, A. K. (2004). *Advanced differential equations*. Discovery Publishing House.
3. Ramana, B. V. (2010). *Higher engineering mathematics*. Tata McGraw Hill Education Private Ltd. (typical year for edition; if your edition year differs, you can replace it with the correct year).
4. Sneddon, I. N. (2006). *Elements of partial differential equations*. Dover Publications, Inc.
5. Sankara Rao, K. (2011). *Introduction to partial differential equations* (3rd ed.). PHI Learning Private Limited.

SEMESTER VI

Major 12: Number theory

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand the basic concepts of Number theory like congruence and divisibility and their application. They will have the knowledge of famous theorem like Fermat's and Chinese Remainder theorem and their application to other field of science.
- solve the day-to-day problems by using Fibonacci sequence and Pell's equation.

Course Outcomes: After successful completion of this course, the learner will able to

- understand the properties of divisibility and prime numbers, compute the greatest common divisor and least common multiples and handle linear Diophantine equations
- use the operations with congruence's, linear and non-linear congruence equations
- apply the theorems: Chinese Remainder Theorem, Lagrange theorem, Fermat's theorem, Wilson's theorem

Unit 1: Basic Concepts

Division algorithm, Greatest common divisor, Euclidean algorithm, least common multiple, Kronecker's theorem

Unit 2: Divisibility Theory

Divisibility, Tests of divisibility

Unit 3: Primes and their distribution

Prime numbers, Fundamental theorem of arithmetic

Unit 4: Theory of Congruence-I

Congruence, Basic properties of congruence, Residue system, Linear congruence

Unit 5: Theory of Congruence-II

Solvability condition of a system of linear congruence, The linear Diophantine theorem, The Chinese Remainder Theorem

Unit 6: Fermat's Theorem

Fermat's factorization method, Fermat's little theorem, Wilson's theorem, Euler's factorization method

Unit 7: Number Theoretic Functions-I

The function τ and σ , The mobius function, The greatest integer function, Euler's function, Some properties of Euler's function

Unit 8: Number Theoretic Functions-II

Function $T(n), S(n), \zeta(n), \phi(n)$

Unit 9: Primitive roots and indices

The order of an integer modulo n , Primitive roots, Primitive roots for primes, Composite numbers having primitive roots, The theory of indices

Unit 10: Quadratic Congruence and Quadratic Reciprocity law-I

Quadratic congruence, Quadratic residue, Euler's residue, Legendre symbol and its properties, Quadratic reciprocity, Quadratic congruences with composite module, Jacobi symbol

Unit 11: Quadratic Congruence and Quadratic Reciprocity law-II

Quadratic reciprocity, Quadratic congruences with composite module, Jacobi symbol

Unit 12: Perfect Numbers

Perfect numbers, Mersenne primes, Fermat number, Pythagorean triples, Other Diophantine equation, Fermat's last theorem

Unit 13: Sum of square of Integers

Sum of two square, Sum of more than two squares

Unit 14: Partitions

Introduction, Graphical Representation, Euler's Partition Theorem, Searching for Partition Identities

Suggested Readings:

1. Burton, D. M. (2007). *Elementary number theory*. Universal Book Stall.
2. Andrews, G. E. (1971). *Number theory*. Hindustan Publishing Corporation.
3. Chowdhury, K. C. (1992). *A first course in theory of numbers*. Asian Books Pvt. Ltd.
4. Niven, I., & Zuckerman, H. S. (2008). *An introduction to the theory of numbers*. John Wiley & Sons.

Major 13: Computer Programming using C

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- develop proficiency in programming using the C language.
- understand basic programming concepts such as data types, variables, control structures, functions, and arrays.
- acquire skills to design and implement efficient algorithms and programs using C language.
- learn to use C programming to solve real-world problems and challenges.

Course Outcomes: After successful completion of this course, the learner will able

- write and debug C programs using variables, data types, control structures, functions, arrays, and pointers.
- design and implement C programs that satisfy given problem requirements using appropriate algorithms and data structures.
- analyze a problem, break it into smaller manageable components, and develop stepwise solutions using programming concepts.
- apply C programming techniques to solve a wide range of real-world computational problems.
- improve logical thinking and problem-solving skills through systematic program

design, coding, and testing.

Unit 1: Introductory Concepts

Basic definition of Pseudo Code, algorithm, flowchart, program

Unit 2: Elements of C Programming

Characters used in C, Identifiers, Keywords, Tokens, Constants, Variables, Types of C variables, Receiving input and output

Unit 3: Variables and Data types

Integer, character floating point and string; Initialization of variable during declarations; Symbolic Constants, type conversion in assignment

Unit 4: Operators and Expressions

Expression in C, Different types of operators: Arithmetic, Relational and Logical, Assignment, Conditional, Increment and decrement, Bitwise, Comma and other operator (size of, periodetc). Precedence and associativity of operators, type casting

Unit 5: I/O Functions

Header Files (stdio, conio), Formatted Input/Output Functions (scanf, printf), Escape Sequences, Character Input/Output Functions (getch, getchar, putchar, gets, puts, getch, clrscr)

Unit 6: Preprocessor Directives

Features of C preprocessor, Macro expansion, Macros with arguments, #if and #elif Directives

Unit 7: Conditional Statements

Conditional Statement- if, if- else, nested if-else, switch-case; break, continue, goto

Unit 8: Loop Control Structures

Concept of Loops, Types of loops: while, do-while, for; nested loops

Unit 9: Storage Class

Automatic, External, Static, Register, Scope and lifetime of variables, Macro, Preprocessor, Directive

Unit 10: Arrays

Array, Array Declaration, 1-Dimensional array, 2-Dimensional array

Unit 11: Strings

String, String Handling Functions: strlen(), strcmp(), strcpy(), strrev(), strcat(), etc

Unit 12: Functions

Function, Function declaration, Function definition, Function call, Formal and Actual parameter, Recursive function

Unit 13: Pointers

Pointer, Pointer declaration, Passing pointer to a function, Pointer and one-dimensional arrays, Dynamic memory allocation

Unit 14: Structures and Union

Structure Declarations, Definitions, Defining your typedef, Array of Structure, Pointer to Structure. Union Declaration, Definition, Declaration, Uses

Unit 15: File Handling

Concept of File, File Pointer, File Opening in various modes, closing a file, reading and writing on files, Formatted Input/Output, fseek(), ftell(), rewind ()

Suggested Readings:

1. Kanetkar, Y. (2018). *Let Us C* (16th ed.). Delhi: BPB Publications.
2. Balaguruswamy, E. (2019). *Programming in ANSI C* (7th ed.). Delhi: Tata McGraw-Hill Education Private Limited

Major 14: Probability and Statistics

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand the origin, scope, and limitations of statistics along with data collection and classification methods.
- prepare frequency distributions, tabulations, and diagrammatic/graphic representations of data.
- compute measures of central tendency (mean, median, mode) and dispersion (range, SD, coefficient of variation).

- analyze correlation, regression, moments, skewness, and kurtosis for data interpretation.
- apply probability theorems, conditional probability, and theoretical distributions (Binomial, Poisson, Normal).

Course Outcomes: After successful completion of this course, the learner will able

- compute measures of central tendency and dispersion including mean, median, mode, standard deviation, and coefficient of variation.
- analyze skewness, kurtosis, correlation, and regression using Karl Pearson's coefficient, Spearman's rank correlation, and regression lines.
- apply probability concepts including conditional probability, Bayes' theorem, and multiplication theorems for events.
- work with random variables and theoretical distributions such as Binomial, Poisson, and Normal distributions.
- present statistical data through classification, tabulation, diagrams, and graphical representations.

UNIT 1: Introduction to Statistics:

Origin and development of statistics, Definition of statistics, Importance and scope of Statistics, Limitation

UNIT 2: Collection of Data:

Primary and secondary data, Methods of collecting primary data, Sources of secondary data

UNIT 3: Classification and Tabulation:

Classification, Variable, Frequency distribution, Tabulation, Types of tabulation,

UNIT 4: Diagrammatic and Graphic Representation:

Diagrammatic representation, Graphic representation of data

UNIT 5: Measures of Central tendency:

Introduction, Arithmetic mean (A.M.), Properties of arithmetic mean, Median, Mode, Geometric mean (G.M.), Harmonic mean (H.M.).

UNIT 6: Measures of Dispersion:

Range, Quartile deviation, Mean deviation, Standard deviation, co-efficient of variation.

UNIT 7: Moments, Skewness & Kurtosis:

Moments, Moments –raw and central, Relation between raw and central moments, Skewness, Measures of skewness, kurtosis, Measures of kurtosis

UNIT 8: Correlation:

Correlation coefficient, Types of correlation, Scatter diagram, Karl pearson coefficient of correlation or product moment of correlation coefficient, Properties, Computation of correlation coefficient from grouped data (Direct method), Spearman's rank correlation coefficient

UNIT 9: Regression:

Regression, Simple linear regression, Formation of regression lines, Correlation vs Regression, Regression coefficient

UNIT 10: Probability:

Basic terminology: Random experiment, sample space, events, Classical definition of probability, Axiomatic approach to probability. Some theorems on probability.

UNIT 11: Conditional probability:

Multiplication theorem of probability, independent events, Multiplication theorem of probability for independent events, Extension of multiplication theorem of probability, Law of Total probability, Bayes' theorem.

UNIT 12: Random variables and probability distribution:

Definition and types of random variables, discrete and continuous random variables, probability mass function, probability density function, Cumulative distribution function, expectation and variance of a random variable

UNIT 13: Theoretical Distribution-I:

Standard Distributions: Discrete type Bernoulli, Binomial, Poisson distributions (definition, properties and applications).

UNIT 14: Theoretical Distribution-II:

Continuous type, Normal (definition, properties and application)

Suggestive Readings:

1. Gupta, S. C., & Kapoor, V. K. (2002). *Fundamentals of mathematical statistics* (11th ed.). Sultan Chand & Sons.
2. Goon, A. M., Gupta, M. K., & Dasgupta, B. (2008). *Fundamentals of statistics*. The World Press Pvt. Ltd.

3. Mukhopadhyay, P. (n.d.). *Applied statistics*. New Central Book Agency Pvt. Ltd. (*Publication year not available online; if you have the year, we can update it.*)
4. Gupta, S. C., & Kapoor, V. K. (2007). *Fundamentals of applied statistics* (4th rev. ed.). Sultan Chand & Sons.
5. Saxena, H. C. (2002). *Elementary statistics*. S. Chand & Company Ltd.
6. Agarwal, B. L. (2006). *Basic statistics* (Revised ed.). New Age International Publishers.

Major 15: Special Functions and Integral Transforms

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand Gamma, Beta functions and their properties, along with relations between them.
- study special functions including Legendre, Bessel, Hermite, and Laguerre polynomials with their orthogonality properties.
- learn Laplace transforms, their properties, inverse transforms, and applications to solve ordinary and partial differential equations.
- analyze Fourier integrals, Fourier transforms, and their properties including convolution theorem.
- apply Fourier transforms to solve ordinary and partial differential equations effectively.

Course Outcomes: After successful completion of this course, the learner will able to

- understand fundamental identities of Gamma and Beta functions and use them to evaluate standard integrals.
- understand Bessel's, Legendre's, Hermite's, and Laguerre's functions and describe their generating functions and recurrence relations.
- find Laplace and Inverse Laplace Transform of various types of functions.
- solve ordinary differential equations, including systems with discontinuities and impulses, using Laplace transform and inverse Laplace transform.
- construct Fourier series for periodic functions and analyse their convergence and applications in solving boundary-value problems.
- compute Fourier transforms, sine and cosine transform, and apply them to solve partial differential equations.

Unit 1: Gamma and Beta Functions

Gamma function, Properties of Gamma function, Transformation of Gamma function, Beta function, Symmetrical property of Beta function, Relation between Gamma and Beta functions.

Unit 2: Legendre Functions – I

Legendre's Differential Equation, Legendre Polynomials, Legendre's function of the first kind, Generating function for Legendre polynomials, Recurrence Formulas.

Unit 3: Legendre Functions – II

Legendre's function of the second kind, Orthogonality of Legendre Polynomials, Associated Legendre function, Orthogonality of Associated Legendre function.

Unit 4: Bessel Functions – I

Bessel's differential equation, Bessel functions of the first kind, Relation between $J_n(x)$ and $J_{-n}(x)$, Integration of Bessel's equation.

Unit 5: Bessel Functions – II

Bessel function of the second kind, Recurrence Relations, Generating function for the Bessel's function $J_n(x)$, Orthogonality of Bessel functions.

Unit 6: Hermite Polynomials

Hermite's equation, Hermite polynomial of order n , Generating function for Hermite polynomials, Orthogonality properties of the Hermite Polynomials, Recurrence Relations.

Unit 7: Laguerre Polynomials

Laguerre's equation, Laguerre polynomial of order n , Generating function for Laguerre polynomials, Orthogonality properties of Laguerre's polynomials.

Unit 8: Laplace Transform-I

Definition of the Laplace transform, Laplace transforms of some elementary functions, piecewise continuity, functions of exponential order, sufficient conditions for existence of Laplace transforms, some important properties of Laplace transforms.

Unit 9: Laplace Transform-II

Definition of inverse Laplace transform, uniqueness of inverse Laplace transforms, Lerch's theorem, some inverse Laplace transforms, some important properties of inverse Laplace transforms.

Unit 10: Application of Laplace Transform to Differential Equations

Solution of ordinary differential equations with constant coefficients, solution of partial differential equations, initial and boundary value problems.

Unit 11: Fourier Integrals

The Fourier Integral Formula, Fourier sine integral, Fourier cosine integral.

Unit 12: Fourier Transform-I

Fourier Transform, Properties of Fourier Transform, shifting property of Fourier Transform, Fourier sine Transform, Fourier cosine Transform, Properties of Fourier cosine and sine Transforms.

Unit 13: Fourier Transform-II

Riemann-Lebesgue Lemma, Fourier Transform of Derivatives, Convolution of functions, Convolution Theorem, Fourier Transform of Derivatives, Fourier cosine and sine transform of derivatives.

Unit 14: Application of Fourier Transform to Differential Equations

Applications of Fourier Transforms to Ordinary Differential Equations, Solutions of Partial Differential Equations, Applications of Fourier Cosine and Sine Transforms to Partial Differential Equations.

Suggested Readings:

1. Kreyszig, E. (1962). *Advanced engineering mathematics*. John Wiley & Sons.
2. Sneddon, I. N. (1972). *The use of integral transforms*. McGraw-Hill.
3. Bracewell, R. N. (1978). *The Fourier transform and its applications* (2nd ed.). McGraw-Hill.
4. Bell, W. W. (1973). *Theory and problems of special functions* (Schaum's Outline Series). McGraw-Hill.
5. Spiegel, M. R. (1974). *Laplace transforms* (Schaum's Outline Series). McGraw-Hill.

SEMESTER VII

Major 16: Advanced Abstract Algebra

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- develop a deeper understanding of group theory, including group actions, permutation representations, and groups acting on themselves by conjugation.
- study important structural results in group theory such as Cayley's Theorem, class equation, Cauchy's theorem, and their applications.
- analyze the structure of finite and finitely generated abelian groups, including primary and invariant factor decompositions and properties of p -groups.
- understand group series and solvable groups, along with refinement and composition theorems.
- introduce advanced concepts of ring theory, including ideals, factor rings, homomorphisms, and classification of important ring structures.
- study polynomial rings and irreducibility criteria, including Eisenstein's criterion and factorization properties.
- develop a clear understanding of field theory, including prime fields, subfields, field extensions, splitting fields, and normal and separable extensions.

Course Outcomes: After successful completion of this course, the learner will be able to

- explain and apply group actions, including permutation representations and groups acting by conjugation.
- describe and use the class equation, Cauchy's theorem, and Sylow theorems to analyze the structure of finite groups.
- decompose finite and finitely generated abelian groups using the Fundamental Theorem of Finite Abelian Groups, including primary and invariant factor decompositions.
- understand and apply direct products of groups, group series, and solvable group structures.
- apply refinement theorems such as the Zassenhaus Lemma, Schreier's Refinement Theorem, and the Jordan–Hölder Theorem.

- identify and distinguish between important ring structures such as Principal Ideal Domains (PID), Euclidean Domains, and Unique Factorization Domains (UFD).
- analyze ideals, prime and maximal ideals, factor rings, and ring homomorphisms using the isomorphism theorems.
- determine irreducibility of polynomials over fields and $\mathbb{Z}$ using Eisenstein's criterion and other tests.
- understand the construction and properties of polynomial rings and finite fields.
- describe field extensions, including algebraic and transcendental extensions, and determine roots and multiplicities of polynomials.
- construct and analyze splitting fields and study their uniqueness.
- explain the concepts of normal, separable, and perfect fields, and classify field extensions accordingly.

Unit 1: Direct Products of Groups

External direct products of groups, Internal direct products, Examples and properties,
Applications of direct products

Unit 2: Structure of Finite Abelian Groups

Fundamental Theorem of Finite Abelian Groups, Decomposition into cyclic groups,
Primary decomposition, Invariant factor decomposition, Illustrative examples

Unit 3: Group Series

Normal series, Subnormal series, Composition series, Refinement of series,
Uniqueness of composition length

Unit 4: Refinement and Structure Theorems

Zassenhaus (Butterfly) Lemma, Schreier's Refinement Theorem, Jordan–Hölder Theorem, Applications of refinement theorems

Unit 5: Class Equation and Cauchy's Theorem

Class equation, Cauchy's theorem, Sylow p -subgroups and its applications

Unit 6: Group Actions and Sylow Theorems

Group Actions, Sylow's theorem, Application of Sylow's theorem

Unit 7: Ring Theory -I

Rings, Integral Domains, Field, Division ring or Skew field, Subrings, Subfields,
Characteristic of Rings

Unit 8: Ring Theory -II

Ideal, Principal Ideal Principal Ideal ring, Divisibility in an Integral domain, Units and Associates, Prime Ideals, Maximal Ideals

Unit 9: Factor Rings and Ring Homomorphism

Factor Ring, Ring Homomorphism, Isomorphism Theorems

Unit 10: Polynomial Rings

Polynomial Rings, Irreducible Polynomials, Irreducibility Tests, Structure of Finite fields

Unit 11: Euclidean and Factorization Domains

Concepts of Divisibility in a ring, Prime and Irreducible elements, Euclidean rings (or Euclidean domain), Unique Factorization Theorem, Unique Factorization Domain,

Unit 12: Extension Fields

Field Extensions, Finite Field Extension, Field adjunctions, Algebraic field extensions, Transcendental element, Roots of a polynomial, Multiple roots

Unit 13: Splitting Field

Root fields, Concept of splitting field, Uniqueness of the splitting field, Examples of splitting field

Unit 14: Normal and Separable Extensions of a field

Normal extensions, Separable Polynomial, Separable Extensions, Perfect field

Suggested Readings:

1. Gallian, J. A. (2015). *Contemporary abstract algebra* (9th ed.). Cengage Learning.
2. Lang, S. (2012). *Algebra* (3rd ed.). Springer.
3. Khanna, V. K., & Bhammbri, S. K. (1999). *A course in abstract algebra*. Vikas Publishing House.
4. Dummit, D. S., & Foote, R. M. (2011). *Abstract algebra* (3rd ed.). Wiley.
5. Fraleigh, J. B. (2002). *A first course in abstract algebra* (4th ed.). Narosa Publishing House.

Major 17: Mechanics and Hydrodynamics

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand the fundamental principles of classical mechanics, including forces, moments, couples, and conditions of equilibrium.
- develop a clear understanding of statics of particles and rigid bodies under coplanar and non-coplanar force systems.
- acquire knowledge of friction and its laws, and apply them to solve related practical problems.
- understand the kinematics and dynamics of particles, including motion under forces, energy, momentum, and angular momentum.
- gain conceptual and analytical understanding of simple harmonic motion and its applications.
- learn the basic principles of hydrostatics and fluid mechanics, including fluid kinematics and dynamics
- apply mathematical techniques to analyze fluid motion, pressure, and conservation laws relevant to physical and engineering problems.

Course Outcomes: After successful completion of this course, the learner will be able to

- analyze different types of forces acting on a particle and determine the resultant force and conditions of equilibrium.
- solve problems related to coplanar forces, moments, and couples using standard principles of statics.
- apply the laws of friction to calculate frictional forces, coefficient of friction, and related quantities.
- understand and apply Newton's laws of motion to study rectilinear and curvilinear motion of particles.
- use the principles of work, energy, and momentum to analyze mechanical systems.
- explain and solve problems involving simple harmonic motion and oscillatory systems
- apply concepts of angular momentum and moment of inertia to rigid body motion.
- demonstrate understanding of hydrostatics, including pressure distribution and equilibrium of fluids.
- analyze fluid motion using Eulerian and Lagrangian descriptions, velocity potential, and stream functions.
- apply fundamental equations of fluid dynamics, including the equation of continuity, Bernoulli's theorem, and Euler's equations.

UNIT 1: Forces:

Types of forces, Magnitude and direction of the resultant of the forces acting on a particle.

UNIT 2: Coplanar forces:

Triangle-law of forces, polygon of forces, Lami's theorem, equilibrium of a particle under several coplanar forces, parallel forces, moments, couples-simple problems.

UNIT 3: Moments and couples:

Definition and examples, simple problem.

UNIT 4: Friction:

Definition, types of friction, laws of friction, simple problems.

UNIT 5: Kinematics of a particle:

Kinematics of a particle, velocity, acceleration, relative velocity, angular velocity, Newton's laws of motion, equation of motion, rectilinear motion under constant acceleration.

UNIT 6: Energy and Momentum:

Definitions, Principle of Conservation of energy, Work energy theorem, Motion of centre of inertia of a system of particles, Centre of mass, Principle of Conservation of linear momentum.

UNIT 7: Simple harmonic motion:

Simple harmonic motion and related problems

UNIT 8: Angular Momentum:

Angular momentum of a single particle, Angular momentum of a system of particles, Conservation of angular momentum, Rigid body, Angular velocity, Moment of inertia, Parallel axis theorem, Angular momentum of a rigid body.

UNIT 9: Hydrostatics:

Pressure equation, condition of equilibrium, lines of force, homogeneous and heterogeneous fluids, elastic fluids, surfaces of equal pressure, fluid at rest under the action of gravity, rotating fluids.

UNIT 10: Properties of Fluids and Gas Laws:

Ideal and real fluids, gas laws, mixture of gases, internal energy, adiabatic expansion.

UNIT 11: Fluid Kinematics:

Velocity of a fluid at a point, Eulerian and Lagrangian methods, streamlines and path lines, steady and unsteady flows, velocity potential, rotational and irrotational motion.

UNIT 12: Fluid Dynamics:

Material, local and convective derivatives, local and particle rate of change, acceleration of a fluid at a point, equation of continuity.

UNIT 13: Equations of Motion:

Euler's dynamical equations, surface conditions, integration of equations, Bernoulli's theorem, Lagrange's equation.

UNIT 14: Rotational Motion:

Rotational motion, irrotational motion, Motion in two dimensions; The stream function; Velocity potential.

Suggestive Readings:

1. Besant, W. H., & Ramsey, A. S. (1988). *A treatise on hydromechanics* (Vols. 1–2). G. Bell and Sons Ltd.; CBS Publishers.
2. Raisinghanian, M. D. (2003). *Fluid dynamics*. S. Chand & Company.
3. Kar, J. M. (1994). *Hydrostatics*. Kalyani Publishers.
4. Loney, S. L. (1906). *The elements of statics and dynamics* (Part I: Statics; Part II: Dynamics). Cambridge University Press.
5. Lamb, H. (1932). *Hydrodynamics* (6th ed.). Cambridge University Press.

Major 18: Graph Theory

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand basic graph concepts, operations, isomorphism, and digraphs.
- analyze connectivity, trees, cut-sets, bridges, and spanning tree algorithms.
- solve traversability problems (Eulerian, Hamiltonian, shortest path).
- study matchings, colorability, planarity, and dominating sets.
- apply graph matrices (adjacency, incidence, cycle, cut-set) for analysis.

Course Outcomes: After successful completion of this course, the learner will able to

- learn and apply the connectedness of graph
- learn and apply the different types of operations of graph
- understand tree and its significance and applications in graph theory
- have the knowledge of point connectivity and line connectivity and their applications
- applications of Eulerian and Hamiltonian graph

- learn and apply the Kuratowski's theorem in planar graph
- learn and apply the point coloring and chromatic number

Unit 1: Introduction to Graph theory

The Königsberg Bridge problem, Graph: Definition, the degree of a vertex, Isomorphism of graphs, Directed graph or Digraph

Unit 2: Graph Operations

Union of two graphs, Edge and Vertex, Joint of two graphs, Product of two graphs, Homeomorphism of Graphs, Intersection Graphs

Unit 3: Bipartite Graphs

Characterizations of bipartite graphs, Cayley's Formula

Unit 4: Connectivity

Walk, Path, Cycle in a graph, Edge and Vertex connectivity

Unit 5: k –Connected graphs

2-connected graphs, k –Connected and k –edge Connected graphs

Unit 6: Tree

Definition, Properties of Trees, Center and Centroid of Tree, Independent Cycles and Co-cycles, Block cut point tree

Unit 7: Cut-Sets and Cut-Vertices

Cut-sets, some properties of Cut-sets, Cut-vertices, Fundamental circuits and cut-sets

Unit 8: Bridges and Algorithm

Bridges, Breadth-first algorithm, Depth-first algorithm, Prim's and Kruskal algorithm, Dijkstra's algorithm

Unit 9: Traversability

Eulerian Graphs, Hamiltonian Graph, The Shortest path problem, The Chinese Postman problem, The Travelling Salesman Problem

Unit 10: Matching and Coverings

Matchings, Coverings, Dominating Sets and Domination numbers, Factorization, Critical Vertices and Edges

Unit 11: Colorability

Vertex Coloring, Chromatic Polynomial, Edge Coloring

Unit 12: Planarity

Planar graph, Kuratowski's Theorem, Outerplanar Graph, The five Color problem, Dual graphs

Unit 13: Matrices: associated with graphs

Adjacency Matrix, The Incidence Matrix, Cycle Matrix, Path Matrix and Cut-set Matrix

Unit 14: Digraphs

Digraph, Directional Duality and Acyclic Digraph, Matrices associated with Digraphs

Suggested Readings:

1. Harary, F. (1988). *Graph theory*. Narosa Publishing House.
2. Balakrishnan, R., & Renganathan, K. (2000). *A textbook of graph theory*. Springer.
3. Bollobás, B. (2002). *Modern graph theory*. Springer.
4. Chartrand, G., & Lesniak, L. (2005). *Graphs and digraphs* (4th ed.). Chapman & Hall/CRC.
5. Wilson, R. J. (2010). *Introduction to graph theory* (5th ed.). Prentice Hall.

SEMESTER VIII

Major 19: Metric space & Topology

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: The course will enable the learners to

- understand basic concepts of point set topology, basis, subbasis, and order topology.
- study continuity, homeomorphisms, open/closed maps, and convergence using nets.
- analyze product topology, box topology, and metric topology with continuity properties.
- explore connectedness, path connectedness, local connectedness, and countability axioms.
- examine compactness, quotient topology, and related topological properties.

Course Outcomes: After successful completion of this course, the learner will be able to

- determine interior, closure, boundary, limit points of subsets and basis and subbasis of topological spaces.
- check whether a collection of subsets is a basis for a given topological space or not, and determine the topology generated by a given basis.
- identify the continuous maps between two spaces and maps from a space into product space and determine common topological property of given two spaces.
- determine the connectedness and path connectedness of the product of an arbitrary family of spaces.
- find Hausdorff spaces using the concept of net in topological spaces and learn about 1st and 2nd countable spaces, separable and Lindelöf spaces.
- learn Bolzano–Weierstrass property of a space and prove Tychonoff theorem.

Unit 1: Open and Closed Sets in $\mathbb{R}$

Real line, open and closed intervals, neighborhood of a point, properties of neighborhoods, upper and lower bounds, supremum and infimum, bounded and unbounded sets, limit points, open sets, closed sets, derived sets.

Unit 2: Bolzano–Weierstrass Theorem

Sequences in $\mathbb{R}$, accumulation points, statement and proof of Bolzano–Weierstrass theorem, applications.

Unit 3: Metric Spaces – Basic Concepts

Definition and examples of metric spaces, pseudo-metric spaces, equivalent metrics, standard metrics on $\mathbb{R}^n$, related theorems.

Unit 4: Topology Induced by a Metric

Open balls and closed balls, neighbourhoods, open and closed sets in metric spaces, accumulation points, closure, interior, exterior, boundary, dense subsets.

Unit 5: Subspaces and Boundedness

Subspace topology of metric spaces, distance of a point from a set, distance between two sets, diameter of a set, bounded and unbounded metric spaces.

Unit 6: Sequences and Completeness

Convergent sequences, Cauchy sequences, complete and incomplete metric spaces, completeness of $\mathbb{R}$, examples.

Unit 7: Introduction to Topological Spaces

Definition of topology, open and closed sets, neighbourhoods, closure and interior, limit points, comparison of topologies, weaker and stronger topologies.

Unit 8: Standard Topological Spaces

Discrete and indiscrete topologies, cofinite topology, usual topology on $\mathbb{R}$, subspace topology, examples and counterexamples.

Unit 9: Continuous Functions and Homeomorphism

Continuity, sequentially continuous, Homeomorphism, Topological property, open and closed maps, Uniform continuity

Unit 10: Separation Axioms-I

T_0, T_1, T_2 Spaces, normal spaces, Hausdorff Spaces, Regular Spaces

Unit 11: Separation Axioms-II

T_3, T_4 -Spaces, completely regular Spaces, Tychonoff Space, completely normal T_0 Space

Unit 12: Compactness-I

Open covers and finite subcovers, compact spaces, finite intersection property, compactness in metric spaces, Bolzano–Weierstrass property.

Unit 13: Compactness-II

Sequential compactness, compactness and continuity, locally compact spaces, compact subsets of $\mathbb{R}$

Unit 14: Connectedness

Separated sets, connected and disconnected spaces, components, totally disconnected spaces, path connectedness, local connectedness, applications.

Suggested Readings:

1. Joshi, K. D. (2017). *Introduction to general topology* (2nd ed.). New Age International Private Limited.
2. Munkres, J. R. (2017). *Topology*. Pearson Education.
3. Simmons, G. F. (2016). *Introduction to topology and modern analysis*. Tata McGraw-Hill Education.
4. Dugundji, J. (1978). *Topology*. Allyn and Bacon Inc.
5. Lipschutz, S. (1981). *General topology* (Schaum's Outline Series). McGraw-Hill.

Major 20: Numerical Analysis

Course Type:	DSC
Number of Credits:	4
Total Marks:	100 (I.A:30, E.S.E: 70)

Course Objectives: This course aims to enable learners to:

- understand the fundamentals of numerical computation and error analysis.
- develop numerical techniques for solving algebraic, transcendental, and differential equations.
- apply interpolation, differentiation, and integration methods numerically.
- analyze convergence, stability, and accuracy of numerical methods.
- introduce numerical methods for solving ordinary and partial differential equations arising in science and engineering.

Course Outcomes: After successful completion of this course, the learner will be able to:

- analyze and estimate numerical errors and convergence behavior of algorithms.
- solve nonlinear equations and systems of linear equations using numerical techniques.
- apply interpolation, numerical differentiation, and numerical integration methods.
- solve eigenvalue problems using standard numerical algorithms.
- obtain numerical solutions of ordinary and partial differential equations using finite difference methods.
- apply numerical methods effectively to real-world scientific and engineering problems.

Unit 1: Error Analysis and Numerical Computations

Approximate numbers and significant figures, Rounding of numbers, Errors, A general formula for errors, Accuracy in the evaluation of a formula, Computer representation of numbers, Floating point Arithmetic, Propagation of errors, Loss of significant digits, propagation of error in function evaluation

Unit 2: Interpolation

Lagrange and Newton Interpolation, Lagrange Interpolation, Newton divided difference Interpolation, Gregory-Newton backward, Central interpolation, Hermite Interpolation

Unit 3: Spline Interpolation

Quadratic Spline Interpolation, Cubic Spline Interpolation

Unit 4: Solution of transcendental and polynomial equations

Solution of equation, Iterative methods and related concepts, Bisection method, The method of iteration, Regula-Falsi method, Secant method, Newton-Raphson method, Roots of a polynomial

Unit 5: Interpolation (With equal Intervals)

Newton's forward interpolation, Backward Interpolation formula, Central-difference interpolation

Unit 6: Interpolation (With unequal Intervals)

Lagrange's interpolation formula, Divided difference, Hermite's interpolation formula

Unit 7: The Accuracy of Interpolation Formulas

Error of polynomial approximation, Remainder term in Newton's forward interpolation formula and in Lagrange's formula, Remainder term in Newton's backward formula

Unit 8: Numerical Differentiation

Numerical differentiation, Derivatives of the functions at the given arguments unequally spaced

Unit 9: Numerical Integrations

Numerical Quadrature, Quadrature formula for equally spaced arguments, The trapezoidal rule, Simpson's $\frac{1}{3}$ rule, Simpson's $\frac{3}{8}$ rule, Newton-Cote's formula

Unit 10: Numerical Solution of Ordinary Differential Equations – I (Basic Methods)

Formulation of initial value problems (IVPs), Picard's method and its convergence, Taylor series method, Euler's method, modified Euler (Heun's) method, local and global truncation errors, comparison of basic methods.

Unit 11: Numerical Solution of Ordinary Differential Equations – II (Higher-Order Methods)

Runge-Kutta methods (second and fourth order), predictor-corrector methods, Adams-Bashforth and Adams-Moulton methods, stability and accuracy considerations, comparison of single-step and multi-step methods.

Unit 12: Numerical Solution of Systems of Linear Algebraic Equations – I (Direct Methods)

Systems of simultaneous linear equations, matrix formulation, Gauss elimination method, Gauss–Jordan method, LU decomposition method, computational cost and limitations of direct methods.

Unit 13: Numerical Solution of Systems of Linear Algebraic Equations – II (Iterative Methods)

Iterative methods for linear systems, Jacobi method, Gauss–Seidel method, convergence criteria, rate of convergence, ill-conditioned systems of equations, conditioning and stability.

Unit 14: Numerical Solution of Partial Differential Equations

Classification of PDEs, finite difference approximations to partial derivatives, solution of Laplace equation, one-dimensional heat equation (parabolic), one-dimensional wave equation (hyperbolic), consistency and stability (introductory treatment).

Suggested Readings:

1. Gupta, R. K. (2019). *Numerical methods: Fundamentals and applications* (1st ed.). Cambridge University Press.
2. Jain, M. K., Iyengar, S. R. K., & Jain, R. K. (2012). *Numerical methods for scientific & engineering computation*. New Age International.
3. Mathews, J. H. (1992). *Numerical methods for mathematics, science and engineering*. Prentice Hall.
4. Scarborough, J. B. (1966). *Numerical mathematical analysis* (6th ed.). Johns Hopkins Press

ANNEXURE II

Krishna Kanta Handiqui State Open University

Hiranya Chandra Bhuyan School of Science and Technology

Discipline of Mathematics

Details of Faculty Members assigned with the responsibility of Course Coordinators

Semester	Course Name	Name of the Faculty	Designation/Subject
I	Classical Algebra and Trigonometry	Dr.Harekrishna Deka	Assistant Professor, Mathematics
II	Calculus	Dr. Himangshu Kumar	Assistant Professor, Mathematics
III	Abstract Algebra & Discrete Mathematics	Dr.Harekrishna Deka	Assistant Professor, Mathematics
	Ordinary Differential Equations	Dr. Himangshu Kumar	Assistant Professor, Mathematics
IV	Analytical Geometry and Vector Calculus	Dr.Bhagyashree Mahanta	Assistant Professor, Mathematics
	Real Analysis	Dr. Firdous Ee Jannat	Assistant Professor, Mathematics
	Linear Algebra	Dr. Firdous Ee Jannat	Assistant Professor, Mathematics
V	Operations Research	Dr. Pappu Das	Assistant Professor, Mathematics
	Complex Analysis	Dr.Bhagyashree Mahanta	Assistant Professor, Mathematics
	Multivariate Calculus	Dr. Firdous Ee Jannat	Assistant Professor, Mathematics
	Partial Differential Equations	Dr. Himangshu Kumar	Assistant Professor, Mathematics
VI	Number theory	Dr. Pappu Das	Assistant Professor, Mathematics
	Computer Programming using C	Dr.Bhagyashree Mahanta	Assistant Professor, Mathematics
	Probability and Statistics	Dr.Harekrishna Deka	Assistant Professor, Mathematics
	Special Functions and Integral Transform	Dr. Himangshu Kumar	Assistant Professor, Mathematics
VII	Advanced Abstract Algebra	Dr. Firdous Ee Jannat	Assistant Professor, Mathematics
	Mechanics and Hydrodynamics	Dr.Bhagyashree Mahanta	Assistant Professor, Mathematics

	Graph Theory	Dr. Pappu Das	Assistant Professor, Mathematics
VIII	Metric space & Topology	Dr.Harekrishna Deka	Assistant Professor, Mathematics
	Numerical Analysis	Dr. Pappu Das	Assistant Professor, Mathematics

ANNEXURE III

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

Guidelines for Seminar Paper Presentations

Four-Year UG Programme in Mathematics

1. Introduction

Under the Four-Year Undergraduate Programme in Mathematics at KKHSOU, students are required to present a Seminar Paper in the seventh semester. The seminar is an important academic activity designed to enhance students' understanding of mathematical concepts, analytical skills, and presentation abilities.

2. Objective of the Seminar

The Seminar Paper presentation aims to:

- Develop students' understanding of advanced mathematical concepts.
- Enhance skills in mathematical writing, analysis, and presentation.
- Foster independent study, critical thinking, and a research-oriented approach.
- Improve communication skills for clearly explaining mathematical ideas.

3. Selection of Topic

- The topic should be relevant to Mathematics and, preferably, aligned with the syllabus or advanced areas of study.
- It should be conceptual, analytical, or application-based in nature.

4. Preparation of Seminar Paper

The Seminar Paper should be well-organized and include the following sections:

(i) Title Page

- Title of the seminar
- Name of the student
- Roll number / Registration number
- Programme name
- Name of the University

(ii) Abstract

- A brief summary (150–250 words) of the topic

(iii) Introduction

- Background of the topic
- Importance and objectives

(iv) Main Content

- Definitions, concepts, and theoretical explanations
- Mathematical formulations and examples
- Diagrams, graphs, or illustrations (if required)

(v) Applications (if applicable)

- Real-life or practical applications of the topic

(vi) Conclusion

- Summary of findings
- Key insights

(vii) References

- Books, journals, websites, etc. (proper citation required)

Key Points:

- a) You should retain a copy of your seminar paper duly signed by your Centre Coordinator, along with a Certificate of Presentation issued by them. The University may request a copy of this report at any time, as required.
- b) You may be asked to present your seminar paper either at the University Headquarters or at any assigned venue, either in face-to-face mode or through an online platform.
- c) Seminar reports must be typed on a computer. They may be printed on both sides of standard A4-size paper, with 1.5-inch margins on the left side and 1.2-inch margins on the right side. In addition, there should be 1.2-inch margins at the top and bottom. Page numbers must be maintained throughout the document. The report should be prepared using Times New Roman or Arial font, with a font size of 12 for the main text and 14 for headings, and 1.5-line spacing should be maintained throughout.
- d) It is essential that the presentation room be well-organised, with a banner of the seminar displayed in the background.
- e) You should request your study centre to maintain a video-recording of your presentation session and obtain a copy of the session you attended.

ANNEXURE IV

Guidelines for the Project/Dissertation of UG Programme in Mathematics

1. Introduction

There is a requirement to prepare and submit a project/dissertation in Four Year Undergraduate programme in Mathematics offered by Krishna Kanta Handiqui State Open University. The Project/Dissertation has been incorporated in the Eighth Semester of this Programme.

The Project/Dissertation is an integral part of the Four-Year Undergraduate Programme in Mathematics. It is designed to provide learners with an opportunity to apply mathematical theories, techniques, and tools to real-life problems or advanced theoretical studies.

The project aims to:

- Develop analytical and problem-solving skills.
- Encourage independent learning and research aptitude.
- Enhance the ability to apply mathematics in practical situations.
- Improve scientific writing and presentation skills.

2. Objectives of the Project

The main objectives of the project/dissertation are:

- To enable learners to explore a specific area of mathematics in depth.
- To develop research-oriented thinking.
- To apply mathematical models and techniques to real-world or theoretical problems.
- To enhance skills in data analysis, interpretation, and presentation.
- To cultivate academic writing and documentation skills.

3. Project Guide Eligibility Criteria

A project guide/supervisor must:

- Hold a Ph.D. or master's degree in mathematics or allied disciplines (such as Statistics, Operations Research, Applied Mathematics, etc.).
- Have a minimum of 2 years of teaching/research experience in a recognized college/university.

4. Nature and Type of Project

- The project may be theoretical, computational, or application oriented.
- The project should:
 - Be original and meaningful.
 - Demonstrate mathematical understanding and application.
 - Be relevant to current academic or practical needs.

5. Suggested Areas for Project Work

Students may select topics from, but are not limited to, the following areas:

- Differential Equations
- Linear Algebra
- Real and Complex Analysis
- Functional Analysis
- Numerical Methods
- Numerical Optimization
- Graph Theory
- Algebra
- Number Theory and Applications
- Mathematical Statistics
- Financial Mathematics
- Mathematical Biology
- Operations Research

The final topic should be selected based on feasibility and guidance from the supervisor.

6. Project Report Preparation

The project report should be well-organized and preferably typed using MS Word.

A. Preliminary Pages

The report must include:

1. Title Page
2. Declaration (by the student)
3. Certificate from the Institution
4. Certificate from Project Guide
5. Acknowledgement (optional)

B. Main Body of the Report

The report should be approximately 7000–8000 words and contain:

- Table of Contents
- Introduction
- Objectives
- Literature Review (if applicable)
- Methodology
- Results
- Analysis and Interpretation
- Conclusions
- Recommendations/Future Scope
- Summary
- Bibliography / References
- Appendices (if any)

7. General Guidelines

- The work must be original and free from plagiarism.
- Proper mathematical notation and formatting should be followed.
- All references must be properly cited.
- Diagrams, tables, and graphs should be included wherever necessary.
- The report should be written in clear and formal academic language.

8. Evaluation of the Project

The project/dissertation will be evaluated based on:

- Quality and originality of the work.
- Understanding of the subject.
- Methodology and analysis.
- Presentation and organization of the report.
- Viva-voce performance.

9. Viva-Voce

- Learners must appear for a viva-voce examination.
- They should be prepared to explain:
 - Objectives and methodology.
 - Key findings.
 - Applications and limitations of the work.

10. Submission Guidelines

- The final report must be submitted within the prescribed deadline.
- Both hard copy and soft copy (as per university norms) must be submitted.

Key Points:

- Always preserve a copy of the report with all necessary original signatures. This may be required for future academic, research, or job purposes. The University may also request a copy of the report.
- You may be asked to present your Report either at the University Headquarters or at any assigned place face-to-face or through online mode.

CERTIFICATE OF ORIGINALITY FROM THE GUIDE

This is to certify that the project report entitled
..... submitted to
Krishna Kanta Handiqui State Open University in partial fulfilment of the requirements for the
award of the degree of B.Sc. (Mathematics), is an original work carried out by
Mr./Ms..... Enrolment No. under the
supervision of Dr./Mr./Ms..... The
work embodied in this project is a genuine work done by the student and has not been submitted
either in part or in full, to this University or to any other University or Institute for the fulfilment
of the requirement of any course of study.

Signature of the Learner

Signature of the Guide

Name

Name

Address:

Designation

Enrolment No.:

Address

**Study Centre's
Seal**

ANNEXURE V

Common Basket of Interdisciplinary Courses (IDC), Ability Enhancement Courses (AECs), Value Added Courses (VACs) and Skill Enhancement Courses (SECs) Along with Detailed Syllabus

List of Courses Semester-wise

SEMESTER	COURSE TYPE	COURSE NAME
I	IDC (any one course needs to be selected from the basket)	101 Functional Assamese* <i>(open to all except those with Assamese as major or minor)</i>
		102 Reading and Writing Skills*
		103 Media Studies*
		104 Distance Education <i>(open to all except those with Education and Sociology as major or minor)</i>
		105 Constitution of India <i>(open to all except those with Political Science as major or minor)</i>
		106 Economy of the North East India <i>(open to all except those with Economics as major or minor)</i>
		107 Understanding Indian Society <i>(open to all except those with Sociology as major or minor)</i>
		108 Introduction to Indian History <i>(open to all except those with History as major or minor)</i>
	AEC	101 General English*
	VAC	101 Environmental Studies and Disaster Management*
	SEC (any one Course only)	101 Office Management*
		102 Organic Farming*
		103 Introduction to Geo-informatics*
II	IDC (any one course needs to be selected from the basket)	201 Select Assamese Literary Texts* <i>(open to all except those with Assamese as major or minor)</i>
		202 General Principles of Writing*
		203 Environmental Education <i>(open to all except those with Education as major or minor)</i>
		204 Issues in Development Communication*
		205 Perspectives on Indian Economy <i>(open to all except those with Economics as major or minor)</i>
		206 Introduction to Ethics <i>(open to all except those with Philosophy as major or minor)</i>
		207 Understanding Social Problems <i>(open to all except those with Sociology as major or minor)</i>
		208 Introduction to History of Assam <i>(open to all except those with History as major or minor)</i>
	AEC (any one Course only)	201 MIL Assamese*
		202 Alternative English*
		203 MIL Bengali*
		204 MIL Hindi*

		205 MIL Bodo*
	VAC	201 Introduction to Yoga*
	SEC (any one Course only)	201 Tea Cultivation and Management*
		202 Electricity and Electrical Wiring*
III	IDC (any one Course needs to be selected from the basket)	301 English for Professional Studies*
		302 Economics of Education* <i>(open to all except those with Education as major or minor)</i>
		303 Business Communication and Media Management*
		304 Understanding North East India <i>(open to all except those with Sociology as major or minor)</i>
		305 Rural Development in India <i>(open to all except those with Economics as major or minor)</i>
		306 Essentials of Indian Philosophy <i>(open to all except those with Philosophy as major or minor)</i>
	AEC	301 Life Skills*
	SEC	301 Cyber Security*
IV	AEC (any one Course only)	401 Studies of Assamese Culture* <i>(open to all except those with Assamese as major or minor)</i>
		402 Spoken English*
		403 English for Media Studies*
VII	SEC	701 Research Methodology

*Note: All Courses marked by * are open to all irrespective of Choices of Major and Minor Subjects*

Detailed Syllabi of Interdisciplinary Courses (IDCs)

IDC 101

Functional Assamese

Course Objective:

After going through this course, a learner will be able to:

- Achieve a clear view of the Assamese Grammar.
- Familiar with the writing style of Assamese language.

Course Outcomes:

- Develop the ability to write in the Assamese language.
- Make use of Assamese grammar and style of writing.

Syllabus

অধ্যায় ১: অসমীয়া ভাষাৰ ব্যাকৰণৰ কেইটামান বিশেষ দিশ – ১

আখৰ, ধ্বনি আৰু বৰ্ণ/আখৰ, বৰ্ণ আৰু ধ্বনিৰ সম্পৰ্ক, অসমীয়া ধ্বনি, উপধ্বনি আৰু তাৰ শ্ৰেণীবিভাজন, বিশিষ্ট ধ্বনি বা বৰ্ণ: বিশিষ্ট স্বৰধ্বনি, বিশিষ্ট ব্যঞ্জনধ্বনি

অধ্যায় ২: অসমীয়া ভাষাৰ ব্যাকৰণৰ কেইটামান বিশেষ দিশ – ২

চন্দ্রবিন্দুৰ ব্যৱহাৰ, গত্ববিধি আৰু ষত্ববিধি, যতিচিহ্ন

অধ্যায় ৩: অসমীয়া ভাষাৰ বিভক্তি আৰু প্ৰত্যয়

বিভক্তি আৰু প্ৰত্যয়, অসমীয়া ভাষাৰ বিভক্তিৰ শ্ৰেণী বিভাগ: শব্দ বিভক্তি বা কাৰক বিভক্তি, পুৰুষবাচক সম্বন্ধবাচক বিভক্তি, ক্ৰিয়া বিভক্তি. অসমীয়া ভাষাৰ প্ৰত্যয়ৰ শ্ৰেণী বিভাগ: কৃৎ প্ৰত্যয় আৰু তদ্ধিৎ প্ৰত্যয়, নিৰ্দিষ্টতাবাচক প্ৰত্যয়

অধ্যায় ৪: অসমীয়া ভাষাৰ বাক্যৰীতি

বাক্যৰীতিৰ সংজ্ঞা, বাক্যৰ শ্ৰেণী বিভাজন, উদ্দেশ্য আৰু বিধেয়, বাক্য, উক্তি, বাক্যত পদৰ ক্ৰম

অধ্যায় ৫: অসমীয়া ভাষাৰ পদ

পদ,পদৰ শ্ৰেণী বিভাজন: সব্যয় আৰু অব্যয়,বিশেষ্য,বিশেষণ,সৰ্বনাম,ক্ৰিয়া

অধ্যায় ৬: অসমীয়া ভাষাৰসন্ধি, সমাস, বচন আৰু লিংগ

সন্ধি,সমাস,বচন,লিংগ

অধ্যায় ৭: জতুৱা ঠাঁচ আৰু খণ্ডবাক্য

জতুৱা ঠাঁচ আৰু খণ্ডবাক্যৰ সংজ্ঞা, অসমীয়া জতুৱা ঠাঁচ আৰু খণ্ডবাক্যৰ প্ৰয়োগ আৰু অৰ্থ

অধ্যায় ৮: শব্দৰ ভুল প্ৰয়োগ, সমোচ্ছাৰিত শব্দ, সমাৰ্থক শব্দ, বিপৰীত শব্দ, বাক-সংহতি

শব্দৰ ভুল প্ৰয়োগ,সমোচ্ছাৰিত শব্দ,সমাৰ্থক শব্দ,বিপৰীত শব্দ,বাক-সংহতি

অধ্যায় ৯: সাম্প্ৰতিক দৈনন্দিন জীৱনত ব্যৱহৃত অসমীয়া ভাষা

দৈনন্দিন জীৱনত ব্যৱহৃত অসমীয়া ভাষা - শব্দৰ ভুল প্ৰয়োগ,এফ এম তথা ভিন ভিন দৃশ্য-শ্ৰাব্য মাধ্যমৰ অসমীয়া ভাষা, নিৰ্দিষ্টতাৰাচক প্ৰত্যয়,কাৰক আদিৰ পৰিহাৰ

অধ্যায় ১০: প্ৰবন্ধ লিখন,সমীক্ষা লিখন আৰু পৰিভাষাৰ প্ৰাথমিক ধাৰণা

প্ৰবন্ধৰ সংজ্ঞা, অৰ্থ আৰু ইতিহাস, লিখন পদ্ধতি - গুৰুত্ব দিবলগীয়া কিছু দিশ,সমীক্ষাৰ সংজ্ঞা, অৰ্থ আৰু ইতিহাস, লিখন পদ্ধতি, বিভিন্ন প্ৰকাৰৰ সমীক্ষা, পৰিভাষাৰ সাধাৰণ পৰিচয়

অধ্যায় ১১: চিঠি, আবেদন পত্ৰ, কাৰ্যালয়ৰ টোকা প্ৰস্তুত আৰু সভাৰ কাৰ্যক্ৰমণিকা লিখন

চিঠিৰ বিভাগ আৰু লিখন পদ্ধতি,আবেদনপত্ৰৰ ভাগসমূহ, লিখন পদ্ধতি, কাৰ্যালয়ৰ টোকা প্ৰস্তুতিৰ পদ্ধতি, সভাৰ কাৰ্যক্ৰমণিকা লিখন

Reading List

Bora Satyanath (1998). *Bohol Byakoron*. Guwahati.

Deka, Dharma Singha (2018). *Rachana Bichitra*. Guwahati: Asom Book Depot.

Goswami, Upendranath (1997). *Axamiya Bhasar Byakoron*. Guwahati: Moni-Manik Prakash

Goswami, Golokchandra (1996). *Axamiya Bornoprokash*. Guwahati: Bina Library

Anker.S(1998). *Real Writing*. Boston: Bedford Books

Misra.P.S.(2009). *An Introduction to Stylistics: Theory and Practice*. New Delhi: Orient Black Swan

Puri, Manohar (2006). *Art of Editing*. New Delhi: Pragun Publications.

IDC 102

Reading and Writing Skills

Learning Objectives

The objectives of the course are to:

- develop reading and writing skills
- provide an idea on the methods and techniques of good reading skills
- provide a detailed study on various aspects and types of writing skills
- enhance the learner's communication skills
- equip the learner with a sound knowledge and good practice of these skills in their practical life

Learning Outcomes

After going through the course, the learner will be able to:

- enhance reading and writing skills
- discuss the methods and techniques of good reading skills
- study the various aspects and types of writing skills in a detailed manner
- enhance the learner's communication skills as it would help in real life contexts and situations
- develop knowledge of different literary forms and their stylistic variations

UNIT 1: SOME CONCEPTS IN READING

Introduction, the Skills of Reading, Reading a Text, The Reading Process, Key Words

UNIT 2: READING A STORY

Introduction, Pre-reading Activities, While Reading a Story, Post-reading Activities

UNIT 3: READING A POEM

Introduction, Pre-reading Activities, Reading the Poem, Post-reading Activities

UNIT 4: READING A PROSE TEXT

Introduction, Pre-reading Activities, While Reading a Prose Text, Post-reading Activities

UNIT 5: READING A PLAY

Introduction, Pre-reading Activities, Reading the Play, Post-reading Activities

UNIT 6: SOME CONCEPTS IN READING I

Introduction, Features of Good Writing: Cohesion

UNIT 7: SOME CONCEPTS IN WRITING II

Introduction, Coherence, Punctuation

UNIT 8: PRÉCIS WRITING

Introduction, Techniques of Faster Reading, Writing a Good Précis, Language Work, Worked out Examples

UNIT 9: REPORT WRITING

Introduction, Language and Style of Reporting, Headlines, Writing a Report

UNIT 10: WRITING FORMAL LETTERS AND FIR WRITING

Introduction, the Structure of a Letter, A Format of FIR

UNIT 11: COMMUNICATION SKILLS

Introduction, What is Communication? Listening Skill, Speaking Skill, Soft Skill, Face-to-Face Oral Communication, Oral Communication and Soft skills, Non-verbal Communication, Telephone Communication, Formal & Informal Telephone Communication, Non-verbal Communication, Cutting in a Long-winded Speech, Analysing Soft Skills, Assertiveness, Social Graces

Reading List

- Bishop, Wendy. (1992). *Working Words: The Process of Creative Writing*. California: Mayfield Publishing Company
- Burroway, Janet. (1992). *Writing Fiction: A Guide to Narrative Craft*. New York: Harper Collins
- Drabble, Margaret. Ed. (2008). *The Oxford Companion to English Literature*. Sixth Edition.
- Hudspn, William Henry. (1995). *An Introduction to the Study of Literature*. New Delhi: Kalyani Publishers.
- Kirszner, Laurie and Stephen Mandall. (2004). *Literature: Reading, Reacting, Writing*. Fifth Edition. Canada: Thomas Wadsworth
- Scholes, Robert and Nancy R. Combey et al. (eds.) (1997). *Elements of Literature*. Fourth Edition. New York: Oxford University Press.

IDC 103

Media Studies

Course Objectives

- To provide an overview of the different types of mass media
- To acquaint learners with the functional process of the media industry
- To provide ground for analyzing the usefulness of different media forms in the society

Course Outcomes

On completion of this course, the learners will be able to

- describe the various forms of media and their functionality
- critically analyze the media forms and their role in society
- examine how the media industry and media content shape our views

Syllabus

UNIT 1: THE MASS MEDIA

Media of Mass Communication, Characteristics of different mass media, Audience, Reach and Access, Role of media, Creating public opinion, Agenda-setting role

UNIT 2: DEVELOPMENT OF MASS MEDIA

Early Communication systems in India, Role of media in India, Freedom struggle and the role of media, Pre-independence era of mass media, Development of Mass Media in the Post Independence Era –Press, Television, Radio, Films, Advertising, Public Relations

UNIT 3: TRADITIONAL FOLK MEDIA

Traditional Folk Media, Advantages of Traditional Folk Media, Folk Media Reflects Social Changes, Traditional Folk Media as Development Media

UNIT 4: PRINT MEDIA

Print media – an introduction, Types of Print Media, Relevance and importance of Print Media — Problems and prospects, History of newspaper - World scenario, Indian scenario, Newspaper categories and formats

UNIT 5: AUDIO MEDIA - RADIO

What is audio media?, Audio media vs print media vs audio-visual media, Radio Contents, Classification of programmes, Various radio programmes, Assamese programmes on radio, The elementary knowledge of radio productions

UNIT 6: VISUAL MEDIA: PHOTOGRAPHY

Concept of Photography, Photography – Basic Idea, Beginning of Photography, Still photography, Technical concepts of Photography, Types of Camera, Types, Parts of a still camera, Movie Camera, Shots and Camera Movements- Shot, Camera Movement

UNIT 7: PHOTOJOURNALISM

Concept of photojournalism, Basics of photojournalism, Photo feature or Photo essay, qualities of a photojournalist, ethics of photography, writing and editing captions

UNIT 8: AUDIO-VISUAL MEDIA: FILM

Film as a mass medium - Characteristics of film, Audience, Impact of film on audience, Film as an industry, Art and Commercial movie, Concept of film appreciation, Film in India- Regional

film, Assamese film, A few important film makers of India, Central Board of Film Certification, Concept of documentaries

UNIT 9: AUDIO VISUAL MEDIA: TELEVISION

Introduction to Television, Brief History of Television in India, *Doordarshan*

UNIT 10: TELEVISION PROGRAMMES AND PRODUCTION

Television programmes – new items, current affairs programme, Television production, Writing for television

UNIT 11: INTRODUCTION TO NEW MEDIA

Concept of new media- Definition, Difference between conventional media and new media, Characteristics of new media, Most common vehicles of new media

UNIT 12: REPORTING FOR MEDIA

Concept of Reporting, The News Reporter- Qualities, Responsibilities, Basic facts about reporting

UNIT 13: MEDIA CONVERGENCE

Convergence – an introduction, Relevance of convergence in the present circumstances, Impact of convergence on conventional forms of media

UNIT14: WRITING FOR RADIO PROGRAMME (PRACTICAL BASED)

Prepare a detailed report for the preparation of a radio programme in the programme format of your choice, based on a minor research, as instructed in the unit.

UNIT 15: FILM REVIEW (PRACTICAL BASED UNIT)

Film review is a great way of analyzing a film by way of expressing your opinion of a movie. In this unit, learners will be required to submit a report on film reviews of any two films of their own choice. One film should be any English language film and the other should be either a mainstream Hindi film or any regional language

Reading List

- Aggarwal, Vir Bala, V.S Gupta (2002) Handbook of Journalism and Mass Communication. New Delhi: Concept Publishing Company
- Narula, Uma. (2006) Communication Models. New Delhi: Atlantic Publishers & Distributors.
- Desai, Amit (2003) Journalism and Mass Communication. New Delhi : Reference Press
- Hodkinson, Paul (2011), Media, Culture and Society, Sage Publications, New Delhi

IDC 104

Distance Education

Course Objectives

- To orient the learners with the nature and need of Distance Education in the present day Indian society.
- To provide the exposure to the learners to different kinds of Information and Communication Technologies (ICT) and apprise them with their use in teaching-learning process.
- To help the learners understand various modes of student support service (SSS) and develop their skills to manage such services for various kinds of programmes through Distance Education.

Course Outcomes

After going through this course, the graduates will be able to:

- acquire knowledge and understanding on the current field of education, particularly distance education
- develop the basic understanding on the emerging issues of open and distance education
- gather the procedural knowledge which are required for performing multidisciplinary and skill based programmes in the 21st century
- apply the acquired specialized technical or theoretical knowledge, cognitive and practical skills in the practical field of life
- employ the right approach to generate solutions to problems related to various approaches of modern higher education.
- acquire the cognitive and technical skills for performing and accomplishing complex tasks relating to the subject on education and other interdisciplinary courses

Syllabus

UNIT 1: DISTANCE EDUCATION

Growth of distance education, distance education in India

UNIT 2: LEARNER-SUPPORT SERVICE

Role of study centre, counselling classes, self-learning materials, different audio-visual aids and other electronic devices

UNIT 3: SELF LEARNING MATERIAL

Need of Self Study Materials in distance education, designing and preparing self-learning material, Planning and development of Study materials, modification and up-gradation of Study Materials.

UNIT 4: STUDY SKILLS

Study skills in distance education, strategies for developing study skills

UNIT 5: CURRICULUM

Concept, curriculum development process-major approaches

UNIT 6: CURRICULUM AND EVALUATION

Need for curriculum evaluation, aspects of curriculum evaluation

UNIT 7: ROLE OF DISTANCE EDUCATION

Distance education for rural development, Distance education for women empowerment

UNIT 8: QUALITY ASSURANCE IN DISTANCE EDUCATION

Quality enhancement, monitoring, feedback and evaluation

UNIT 9: ASSESSMENT IN DISTANCE EDUCATION

An overview on assessment, purposes of assessment, assessment in open and distance learning

UNIT 10: INTERVENTION STRATEGIES

Information and communication technologies and their application in distance education.

UNIT 11: NEW INTERVENTIONS IN OPEN AND DISTANCE LEARNING

MOOCs and Open Educational Resources and its application for opening knowledge movement in India

Reading List

- Aggarwal, D.D. Future of Distance Education, Sarup & Sons, New Delhi, 2007
Bansal, Aarti: Distance Education in 21st Century, Sublime Publications, Jaipur, 2004
Rao, V.K.: Distance Education, APH Publishing Corporation, New Delhi, 2007
Siddiqui, Mujibul Hasan: Distance Education, Theory and Research, A.P.H. Publishing Corporation, Ansari Road, New Delhi, 2007
Shardindu: Open and Dual Mode University System in India, Vani Prakasan, New Delhi, 2008

IDC 105

Constitution of India

Course Objectives

The course aims to providing learner

- An understanding of the background and process of making of the Constitution of India
- An awareness about the core values of principles underlying the Constitution of India
- An account of basic constitutional provisions and framework of governments' operation in service of the people of the country
- A sense of duties and responsibilities of as a citizen of the country

Course Outcomes

After completing the course, a learner will be able to

- Understand and appreciate the background, context and process of making of the Indian Constitution
- Appreciate and imbibe the core values and principles of the Constitution of India
- Act as a responsible citizen of the country performing her/his duties and responsibilities

Syllabus

UNIT 1: HISTORICAL BACKGROUND OF THE INDIAN CONSTITUTION

Constitutional Developments during the British Period: 1773 to 1947

UNIT 2: MAKING OF THE INDIAN CONSTITUTION

Formation of the Constituent Assembly, Drafting Committee, Adoption of the Constitution of India

UNIT 3: PHILOSOPHY AND IDEALS OF THE INDIAN CONSTITUTION

Philosophy and Ideals of the Indian Constitution: The Preamble of the Constitution of India; Sources of the Indian Constitution

UNIT 4: FEATURES OF THE INDIAN CONSTITUTION

Salient Features of the Indian Constitution

UNIT 5: FUNDAMENTAL RIGHTS AND FUNDAMENTAL DUTIES

Meaning, Historical Background, Nature, Importance, Categories of Fundamental Rights, Limitations of Fundamental Rights; Fundamental Duties: Background, Types and Significance of Fundamental Duties

UNIT 6: DIRECTIVE PRINCIPLES OF STATE POLICY

Meaning, Nature and Classification of Directive Principles of State Policy; Difference between Fundamental Rights and Directive Principles of State Policy

UNIT 7: RELATIONS BETWEEN FUNDAMENTAL RIGHTS AND DIRECTIVE PRINCIPLES

Relationship between Fundamental Rights and Directive Principles of State Policy

UNIT 8: GOVERNMENT AT THE UNION AND STATE LEVELS

Government at the Union level: The President of India, The Vice-President of India, The Union Council of Ministers, The Prime Minister; Government at the State level: The Governor, The State Council of Ministers and the Chief Minister

UNIT 9: THE PARLIAMENT OF INDIA AND THE STATE LEGISLATURE

Composition of the Parliament of India: The President, The Rajya Sabha, The Lok Sabha; Powers and Functions of the Parliament; Relation between the two Houses of the Parliament; Legislative Procedure: Procedure for a Money Bill; The State Legislature: The Legislative Assembly or Vidhan Sabha, The Legislative Council or Vidhan Parishad

UNIT 10: JUDICIARY IN INDIA

Supreme Court and High Courts; The Supreme Court; The High Court: Subordinate Courts; Judicial Review, Judicial Activism and Independence of the Judiciary in India: Judicial Review, Judicial Activism, Independence of the Judiciary in India

UNIT 11: NATURE OF INDIAN FEDERALISM

Nature of Indian federalism: Federal features, Unitary or non-federal features; Centre-State Relations-Division of powers between the Union and State governments: Legislative Relations, Administrative Relations, Financial Relations; An estimate of Indian federalism

Reading List

- Basu, D. D. (2009). Introduction to the Constitution of India. New Delhi: Prentice Hall of India.
- Brass, Paul R. (1997). The Politics of India Since Independence. New Delhi: Cambridge University Press.
- Chander, Prakash (2000). Indian Government and Politics. New Delhi: Cosmos Bookhive Pvt. Ltd.
- Dev, B.J and Lahiri, D.K. (1985). Assam Muslims- Politics and Cohesion. Delhi: Mittal Publication.
- Ghai, K. K. (2007). Indian Government and Politics. New Delhi: Kalyani Publishers.
- Kapur, Anup Chand & Misra, K. K. (2006). Select Constitutions. New Delhi: S. Chand and Company.
- Kothari, Rajni. (2009). Politics in India. New Delhi: Orient BlackSwan Private Limited.
- Palanithurai, G. (2000). Grass-root Democracy in Indian Society. New Delhi: Concept Publishing Company.
- Pylee, M. V. (2006). Constitutional Government in India. New Delhi: S. Chand and Company.
- Singh Sisodia, Yatindra (2005). Functioning of Panchayati Raj System. Jaipur: Rawat Publication.
- Jayal, Niraja Gopal; Mehta Pratap, Bhanu (eds) (2010). Oxford Companion to Politics in India. New Delhi. Oxford University Press.

IDC 106

Economy of the North East India

Course Objectives

- To provide knowledge on different aspects of the Indian economy
- Help to analyse the service sector growth and recent important issues in the Indian economy

Course Outcomes

- This course will enable the learners to explain various important aspects of the Indian economy
- This course will also help the learners to analyse the different factors relating to the recent service sector growth and other important issues in the Indian economy

Syllabus

UNIT 1: INDIAN ECONOMY: ITS BASIC CHARACTERISTICS, DEVELOPMENT AND GROWTH

Indian Economy in the pre-independence period, Characteristics of India as a developing economy; Emerging Issues of development in the Indian economy, National Income: Trends, size and Composition

UNIT 2 : POPULATION AND HUMAN RESOURCES

Size, and growth of Population; Characteristics of the population: sex ratio, age composition, density, rural-urban ratio and occupational distribution. Indicators of Human Development: Life Expectancy, Infant Mortality and Literacy

UNIT 3: INFRASTRUCTURE IN THE INDIAN ECONOMY

Infrastructural Facilities in India: Energy, Power, Transport and Communication, Urban Infrastructure in India, Industrial Corridor and Smart Cities

UNIT 4: INDIAN AGRICULTURE & GREEN REVOLUTION

Role of agriculture in Indian economy; Nature of India's agriculture; Trends in Agricultural Production and Productivity; Factors Influencing Productivity; The new agricultural strategy and the Green Revolution; Impact of Green Revolution

UNIT 5: AGRICULTURAL FINANCE, RURAL CREDIT AND AGRICULTURAL MARKETING

Need for agricultural finance; Sources; Role of Rural co-operatives; commercial banks and Regional rural banks; Role of NABARD. Agricultural marketing: Concept and basic requirements; Limitations of agricultural marketing; Role of the Government in promoting agricultural marketing

UNIT 6: FOOD SECURITY AND PUBLIC DISTRIBUTION SYSTEM IN INDIA

Concept of Food Security; Salient Features of Food Security Act 2013, Public Distribution Systems and Its Impact on Poverty; Problems of the PDS and Suggestive Measures

UNIT 7: INDIAN INDUSTRY – DEVELOPMENTAL EXPERIENCE

Strategy of Industrial Development in India; Industrial Development since Independence; Problems of Industrialisation in India; Industrial Policy Resolution, 1956; New Industrial Policy, 1991; Recent Policy Reform Measures in Initiated in the Industrial Sector

UNIT 8: THE ROLE OF THE TERTIARY SECTOR IN THE INDIAN ECONOMY

Changing role of the Tertiary Sector in the Indian Economy; The Recent Growth of the IT and other service sectors; Major Issues in faced by the Service Sector and Suggestive Policy Measures

UNIT 9: UNORGANISED SECTOR, LABOUR PROBLEMS AND LABOUR POLICY

Unorganised Sector and India's Informal Economy; Size and Features; Major Issues; Suggestive Measures; Present Status of Agricultural Labours in India; Major Recommendations of the National Commission on Rural Labour; Features of Industrial Labour; Trade Union Movement in India; Settlement of Industrial Disputes; Social Security Measures introduced for the welfare of the labours; Problems in the Labour Market and Suggestive Measures.

UNIT 10: PLANNING FOR DEVELOPMENT

Economic Planning in India; Overall Objectives of Economic Planning; Overall Achievements and Failures of Economic Planning; The Current Five Year Plan: Objectives and Targets Major Objectives, Targets and Achievements of the Last Five Year Plan; Critical Assessment.

UNIT 11: ECONOMIC REFORMS AND GLOBALISATION

Economic Crisis prior to 1991 Economic Reforms; New Economic Policy of 1991; Indian Economy since Economic Reforms

Reading List

- Agarwal, A.N. (2015): *Indian Economy: Problems of Development and Planning*, Ed., New Age International.
- Datt and Mahajan (2015): *Indian Economy*, 71st Ed., S. Chand & Co. Ltd.
- Dhingra, I. C. (2014): *Indian Economy: Environment and Policy*, Sultan Chand & Sons
- Kapila, U (2015): *Indian Economy: Performance and Policies*, 15th Edition, Academic Foundation.
- Misra and Puri (2016): *Indian Economy: Its Development Experience*, 31st Ed., Himalaya Publishing House.

IDC 107

Understanding Indian Society

Learning Objectives

This course intends to:

- enable the learners to understand about different types of Indian Society
- enable the learners to know about the major social institutions like Family, Marriage, Kinship, Caste, and Tribe of India
- enable the learners to know about the status of Women in India

Learning Outcomes

After going through this course, learners will be able to:

- Understand about different types of Indian Society
- know about the major social institutions like Family, Marriage, Kinship, Caste, and Tribe of India
- know about the status of Women in India

Syllabus

UNIT 1: INDIAN SOCIETY: UNITY IN DIVERSITY

Meaning and Definition of Society and Culture; Indian Society and Culture; Unity and Diversity: Meaning and Concept; Forms of Diversity in India: Geo-physical diversity, Racial diversity, Linguistic diversity, Religious diversity.

UNIT 2: TYPES OF INDIAN SOCIETY

Urban Society; Classification of Cities; Problems of Urban Society; Rural Society in India, Types of Indian Villages, Local Self-governance in the Rural Areas, Criticisms of local self-governance system; Tribal Society in India; Approaches towards tribal society, Significance of 5th and 6th schedule of the Indian Constitution

UNIT 3: MARRIAGES AND FAMILY IN INDIA

Family and marriage, Concepts, Types, Criteria of family formation; Some important dimensions of family: Household, Patriarchy, Gender division of labour

UNIT 4: KINSHIP SYSTEM

Meaning; Definition; Types; degree of Kinship Rules; Taboos; Kinship structure and pattern in the different geographical zones across India

UNIT 5: CASTE IN INDIA

Caste –Meaning and Characteristics; Jati and Varna; difference between Caste and Class; Jajmani system; Dominant Caste; Caste through the Ages; Administrative Interpretation of Caste: Scheduled Castes and their problems; Abolition of Untouchability

UNIT 6: CHANGING NATURE OF CASTE

Casteism – Meaning and causes; Relationship between Caste and Politics; Caste and Voting behaviour; Political Elite, Caste Mobilisation

UNIT 7: TRIBES IN INDIA

Tribe: Definition and Meaning; Characteristics; T.B. Naik's Characterisation of Tribe; Anthropological Convention; Constitution of India and Scheduled Tribes; Common

Characteristics; Classification and Distribution of Tribes; British Policy towards the Tribes; Policy during the Post-Independence Period

UNIT 8: WOMEN IN INDIAN SOCIETY

Women in Ancient India: Vedic and Post – Vedic Periods; Buddhist period; Medieval Period; Reform Movements and Struggle for Independence; Gender Relation in different period; Women Empowerment.

UNIT 9: ECONOMY OF INDIAN SOCIETY

Economy and types of Economies; Traditional Economic system and its characteristics; Command Economic system and its characteristics; Market Economic system and its characteristics, Mixed Economic system and its characteristics; Indian Economy before Independence; Indian Economy Post Independence Period; New Economic Policies: Liberalization, Globalization, Privatization

UNIT 10: POLITICS IN INDIA

Evolution of Indian Political Structure; Indian Structure Post Independence; Society; Decentralisation of power; Political Elite; Political Parties; Emergence of Electoral System

UNIT 11: RURAL LIFE IN INDIA

Evolution of Indian Villages; Characteristics of Indian villages; Agrarian Societies: Agrarian Class Structure; Land Reforms and Changes: Land Reforms in post-independence period, Current Scenario of Land Reforms in India

Reading List

- Beteille, A., 1969, (ed.): Social Inequality: Selected Readings. Harmondsworth: Penguin Books.
- Srinivas, M.N., 1962, Caste in Modern India and other essay. Bombay: Asia Publishing House.
- Dumont, L., 1991, “Hierarchy Status and Power: The Caste System and its implications” in
Dipankar Gupta (ed.), Social Stratification .Delhi: Oxford University Press..
- Berberman, G. D., 1991, “The Brahmanical View of Caste” in Dipankar Gupta (ed.), Social Stratification. Delhi: Oxford University Press.

IDC 108

Introduction to Indian History

Course Objectives

- This course is an introductory course intending to introduce Indian history to the learners
- To give a brief idea about the different sources of Indian history
- To discuss important political events of Indian history throughout the ages

Course Outcomes

After completing this course

- Learners are expected to have a fair knowledge about the history of India
- Learners will be able to understand different sources of Indian history
- Learners will be able to analyse major political events of India from different historical perspectives

Syllabus

UNIT 1: INTRODUCTION TO HISTORY

What is History, Scope and Meaning of History, Relationship of History with other Social Sciences

UNIT 2: SOURCES OF ANCIENT INDIAN HISTORY

Literary Sources, Archaeological Sources, Foreign Sources

UNIT 3: EARLY INDIAN CIVILIZATIONS

Harappan Civilization, Vedic Civilization

UNIT 4: POLITICAL DEVELOPMENTS IN MEDIEVAL INDIA

The Delhi Sultanate, Advent of the Mughals and Second Afghan Empire

UNIT 5: SOCIETY, ECONOMY, RELIGION AND CULTURE IN MEDIEVAL INDIA

Social Condition, Economy, Bhakti Movement and Sufi Movement; Art, Architecture and Literature of the Sultanate Period, Social Condition in the Mughal Period, Economy in Mughal India, Religious Conditions during Mughal Rule, Cultural Activities under the Mughals

UNIT 6: ADVENT AND ESTABLISHMENT OF BRITISH RULE IN INDIA (UP TO 1857)

Foundation, Expansion and Consolidation of the British Empire, Constitutional and Administrative Changes, British Economic Policy, revolt of 1857

UNIT 7: SOCIO-RELIGIOUS MOVEMENTS

Causes of the Socio-Religious Movements, Socio-Religious Movements under Colonial rule, Movement for emancipation of Women

UNIT 8: EMERGENCE OF NATIONALISM AND FOUNDATION OF INC

Emergence of Organised Nationalism, Different Political Associations, Foundation of Indian National Congress, Uprising of different peasant and tribal Movements

UNIT 9: INDIAN NATIONAL MOVEMENT UP TO 1916

Partition of Bengal and Swadeshi Movement, Revolutionary National Movements

UNIT 10: INDIAN NATIONAL MOVEMENT FROM 1916 TO 1939

Rise of Gandhi and his Ideology, Non-Cooperation Movement, Khilafat Movement Civil Disobedience Movement and Government of India Act 1935

UNIT 11: INDIAN NATIONAL MOVEMENT FROM 1939 TO 1947

August Offer and Quit India Movement, Subhas Chandra Bose and Indian National Army

UNIT 12: PARTITION AND TRANSFER OF POWER

Post-War Development-Change in British Attitudes, Communal Policies and Partition

Reading List

- Chandra, Satish. (1990). Medieval India, NCERT, New Delhi
Chandra, Sathish(2007) A History of Medieval India, Orient Black Swan, New Delhi
Chattopadhyaya, Brajadulal (2012). The Making of Early Medieval India, Second edition, Oxford Press, New Delhi
Jha, D.N. (1977), AncientIndia-An Introductory Outline, Peoples' Publishing House, New Delhi-110055
Kosambi, D.D. (2001): The cultural and Civilization of Ancient India in Historical Outline, Vikas Publishing House

IDC 201

Select Assamese Literary Texts

Course Objectives

After going through this course, a learner will be able to:

- Identify the accent of different literary genera of Assamese literary texts.
- Discuss the writing style of diverse Assamese literary texts.

Course Outcomes

After going through this course, a learner will be able to:

- Evaluate the history and trends of distinct Assamese literary genera.
- Formulate the trends of Assamese poetry, drama, novel, and prose since inscriptions.

Syllabus

অধ্যায় ১: অসমীয়া লোককবিতা

অসমীয়া লোকগীত/লোক কবিতাৰ সাধাৰণ পৰিচয়, শ্ৰেণীবিভাজন, *প্ৰাণ গোপাল*, *পাতিলা মায়াৰে খেলা*: কামৰূপী লোকগীতৰ সাধাৰণ পৰিচয়, গীতটিৰ সাধাৰণ আলোচনা

অধ্যায় ২: শংকৰদেৱ: নন্দোৎসৱ

শংকৰদেৱ : *নন্দোৎসৱ* - মূলপাঠ : কবি পৰিচয়, কবিতাটিৰ মূলভাব, কবিতাটিৰ সাধাৰণ আলোচনা, শব্দার্থ

অধ্যায় ৩: ছাহমিলান : অধমে লইলোঁ, অধমে লওঁ, আল্লাৰ নাম

ছাহমিলান : অধমে লইলোঁ, অধমে লওঁ, আল্লাৰ নাম (জিকিৰ) - মূলপাঠ : কবি পৰিচয়, জিকিৰৰ সাধাৰণ পৰিচয়, কবিতাটি (জিকিৰ)ৰ মূলভাব, কবিতাটি (জিকিৰ)ৰ সাধাৰণ আলোচনা, শব্দার্থ

অধ্যায় ৪ : অম্বিকাগিৰী ৰায়চৌধুৰী : গঢ়া কৰি মোক ঝাড়ুদাৰ

অম্বিকাগিৰী ৰায়চৌধুৰী: গঢ়া কৰি মোক ঝাড়ুদাৰ - মূলপাঠ: কবি পৰিচয়, কবিতাটিৰ মূলভাব, কবিতাটিৰ সাধাৰণ আলোচনা

অধ্যায় ৫: হেমবৰুৱা : মমতাৰ চিঠি

হেমবৰুৱা: মমতাৰ চিঠি - মূলপাঠ: কবিপৰিচয়, কবিতাটিৰ সাধাৰণ আলোচনা

অধ্যায় ৬: লক্ষ্মীনাথ বেজবৰুৱা : ভদৰী

লক্ষ্মীনাথ বেজবৰুৱা: ভদৰী - মূলপাঠ : জীৱন আৰু কৃতি, গল্পটিৰ সাধাৰণ আলোচনা

অধ্যায় ৭: যোগেশ দাস : পৃথিৱীৰ অসুখ

যোগেশ দাসৰ জীৱন আৰু কৃতি: যোগেশ দাসৰ গল্পৰ মূলসুৰ, পৃথিৱীৰ অসুখ: গল্পটোৰ বিষয়বস্তু আৰু সাধাৰণ আলোচনা, চুটিগল্প হিচাপে পৃথিৱীৰ অসুখ

অধ্যায় ৮: বাণীকান্ত কাকতি : সাহিত্যত কৰুণ ৰস

বাণীকান্ত কাকতিৰ জীৱন আৰু কৃতি: সাহিত্য সমালোচক হিচাপে বাণীকান্ত কাকতি, কাকতিৰ প্ৰবন্ধশৈলীৰ বৈশিষ্ট্য, সাহিত্যত কৰুণ ৰস: প্ৰবন্ধটোৰ বিষয়বস্তু, সাধাৰণ আলোচনা

অধ্যায় ৯: ৰজনীকান্ত বৰদলৈ : নিৰ্মলভকত – ১

ৰজনীকান্ত বৰদলৈৰ জীৱন আৰু কৃতি, নিৰ্মল ভকত উপন্যাসখনৰ সাধাৰণ আলোচনা

অধ্যায় ১০: ৰজনীকান্ত বৰদলৈ : নিৰ্মলভকত – ২

উপন্যাসখনৰ চৰিত্ৰ চিত্ৰণ, উপন্যাসখনৰ বৈশিষ্ট্যসমূহ

অধ্যায় ১১: শংকৰদেৱ - কালিদমন

অংকীয়া নাট: 'অংকীয়া নাট' শব্দ দুটাৰ তাৎপৰ্য আৰু ইয়াৰ উৎপত্তি, অংকীয়া নাট ৰচনাৰ কলা-কৌশল, অংকীয়া নাটৰ বৈশিষ্ট্য, নাট্যকাৰ শংকৰদেৱ, কালিদমন: নাটৰ মূল আৰু বিষয়বস্তু, সাধাৰণ আলোচনা, ৰসবিচাৰ

Reading List

Bora, Mahendra (1976). *Ramanyasbaad*. Pathshala: Bani Prakash
Baruah, Prahlad Kumar (2005). *Asomia Chutigalpa Adhyayan*. Guwahati: Banalata.
Bharali, Sailen (2003). *Upanyas: Bichar Aru Bislekhon*. Guwahati: Chandra Prakash.
Deva Goswami, Keshavananda (1979). *Ankmala*. Guwahati: Banalata
Gogoi, Lila (1968). *Asomia Luka-Sahityar Ruprekha*. Golaghat: Nabin Pustak Bhandar.
Goswami, Trailukyanath (2006). *Adhunik Galpa Sahitya*. Guwahati: Bani Prakash Pvt
Ltd.
Hazarika, Atulchandra (1988). *Manchalekha*. Guwahati: Lawyers Book Stall.
Kataki, Prafulla (1995). *Swarajuttor Axamiya Upanyas Samiksha*. Guwahati: Bina
Library.
Pujari, Archana (Edited). (2000). *Axamiya Kobitar Bichar Bislekhon*. Panbazar,
Guwahati: Jyoti Prakashan
Sharma, Hemanta Kumar (1998). *Axamiya Lokagiti Sanchayan*. Panbazar, Guwahati:
Bina Library
Sharma, Satyendranath (2009). *Axamiya Natya Sahitya*. Guwahati: Saumar Prakash

IDC 202

General Principles of Writing

Learning Objectives

The objectives of the course are to:

- provide an idea of certain general principles of writing
- highlight some of the important aspects of English Grammar
- take up the important skills of editing, copy editing and proof reading
- enable the learner to develop adequate writing skills in English

Learning Outcomes

After going through the course, the learner will be able to:

- gain a systematic idea of the various aspects and principles of writing
- take into account some of the important aspects of English Grammar
- practice the important skills of editing, copy editing and proof reading
- take up writing as a career option after completion of the course

Syllabus

UNIT 1: THE WRITER AS AN ARTIST

Introduction, Art and Aestheticism, Narration and Narrative, Narrative and Plot, The Author and the Writing, Point of View and Voice

UNIT 2: WORDS

Introduction, Words and Word Classes

UNIT 3: NARRATION AND VOICE

Introduction, Direct and Indirect Narration, Assertive Sentences, Imperative Sentences, Interrogative Sentences, Exclamatory Sentences, The Category of Voice in English, Assertive Sentence Forms, Interrogative Sentence Forms, Imperative Sentence Forms, Miscellaneous Sentence Forms

UNIT 4: TIME, TENSE AND ASPECTS

Introduction, Time and Tense, Tense and Aspect, The Present Tense, Simple Present Tense, Present Continuous Tense, Present Perfect Tense, Present Perfect Continuous Tense, The Past Tense, Simple Past Tense, Past Continuous Tense, Past Perfect Tense, Past Perfect Continuous Tense, The Future Tense, Simple Future Tense, Future Continuous Tense, Future Perfect Tense, Future Perfect Continuous Tense

UNIT 5: PHRASES AND IDIOMS

Introduction, Samples of Phrases and Idioms

UNIT 6: AMPLIFICATION OF AN IDEA

Introduction, Process Analysis of Amplification, Amplifications Worked Out

UNIT 7: REVIEW WRITING

Introduction, Techniques of Book Review, Techniques of Film Review, Techniques of Play Review, Techniques of Musical Review

UNIT 8: WRITING FOR COLUMN, SCIENCE AND PRESS RELEASE

Introduction, Column Writing, Science Write- up, Press Release

UNIT 9: EDITORIAL WRITING

Introduction, Introduction to the Editorial Page, Writing the Editorial, Writing the Feature, Writing the Article, Writing the Middle, Letters to the Editor

UNIT 10: COMPREHENSION OF AN UNSEEN PASSAGE

Comprehension, Intelligent Reading, Tackling Unseen Passages, Answering Unseen Passages, Examples with Answers

UNIT 11: SHORT COMPOSITION [NOTICE, CLASSIFIED, ADS. ETC.]

Introduction, Notice Writing, Format of a Notice, Worked Out Examples, Advertisements, Classified Advertisements, Worked Out Examples, Commercial Advertisements, Worked Out Examples

Reading List

- Anker, S. (1998). Real Writing, Boston: Bedford Books.
Bell, Madison Smartt (1997). Narrative Design: Working with Imagination, Craft and Form, New York: WW. Norton.
Brande, Dorothea. (1981). Becoming a Writer, New York: Penguin.
Earnshaw, Steve (ed.) (2007). The Handbook of Creative and Media Writing, Edinburg University Press.
Geddes and Gresset. (2003). Spelling Grammar and Usage, Webster Reference Library.
Kirsznar & Mandell. (2004) Literature: Reading, Reacting, Writing. Fifth Edition. Thomson Wadsworth: Massachusetts.
Seely, John (1998), Oxford Guide to Effective Writing and Speaking, Oxford: Oxford University Press

IDC 203

Environmental Education

Course Objectives

- To make the learners aware of environmental problems and to familiarize the students with the concept and importance of environmental education.
- To make the learners aware of the various mechanisms of environmental protection and promotion.

Learning Outcome

After going through this course, the graduates will be able to:

- acquire knowledge and understanding on the subject like Environmental education
- develop the basic understanding on the emerging issues of environmental education as a subject as a whole.
- gather the procedural knowledge which are required for performing multidisciplinary and skill based programmes in the 21st century
- acquire the cognitive and technical skills for performing and accomplishing complex tasks relating to the subject on education and other interdisciplinary courses
- formulate coherent arguments about ethical and moral issues, including environmental and sustainable development issues, from multiple perspectives.

Syllabus

UNIT 1: ENVIRONMENTAL EDUCATION

Meaning, nature, importance, scope, goals and objectives of Environmental Education

UNIT 2: METHODS OF ENVIRONMENTAL EDUCATION

Observation, Fieldtrips, Project method, co-curricular activities, dramatization, discussion, problem-solving method

UNIT 3: ENVIRONMENTAL MOVEMENTS IN INDIA

Appiko Movement, the Silent Valley Movement, Chipko Movement, the Chilika Bachao Andolan, Narmada Bachao Andolan

UNIT 4: MEDIA OF ENVIRONMENTAL EDUCATION

Concept of Instructional media, magazine, seminar, workshop, exhibitions, models, audio-visual aids

UNIT 5: PROGRAMME OF ENVIRONMENTAL EDUCATION

Programme for primary level, Secondary level and higher level

UNIT 6: ENVIRONMENTAL DEGRADATION

Concept of Environmental degradation, types, causes and prevention of environmental degradation

UNIT 7: ENVIRONMENTAL POLLUTION

Meaning of Environmental Pollution, types of Environmental Pollution- air, water, land or soil, solid-waste, noise, and radio-active pollution

UNIT 8: CONSERVATION AND PROTECTION OF ENVIRONMENT

Meaning of conservation and protection of Environment, need and importance of conservation and protection of environment, role of individual and society towards conservation and protection of Environment

UNIT 9: ENVIRONMENT AND LEGAL PROVISIONS

Legal and Constitutional Provisions for Conservation and Protection of Environment

UNIT 10: SUSTAINABLE DEVELOPMENT

Concept of Sustainable development, characteristics and education for sustainable development

UNIT 11: ENVIRONMENTAL EDUCATION

Its problems and prospects with special reference to Assam

Reading List

- R. C. Sarma: Environmental Education, Surya Publication, Meerat, 1997.
- R.A Sharma: Environmental Education, Metro Politary Book Co. Pvt,Ltd, New Delhi.
- Mahapatra D: Environmental Education.

IDC 204

Issues in Development Communication

Course Objectives

- To familiarize learners with the concepts of development communication
- To provide knowledge on process of development communication and its importance
- To provide understanding on the need and importance of development communication
- To provide knowledge about the global issues related to development communication

Course Outcomes

- On completion of this course, the learners will be able to-
- explain the concepts and importance of development communication
- describe the need of international communication
- identify the issues related with the concept and its implications

Syllabus

UNIT 1: DEVELOPMENT

Meaning of Development, Concept of Development, Alternative Approaches to Development, Indices to Development, Dominant Paradigm of Development - Approaches to Dominant Paradigm of Development, Critique of Dominant Paradigm of Development, Modernisation and Dependency Approach, Core Areas of Development, Development as Economic Growth

UNIT 2: INTRODUCTION TO DEVELOPMENT COMMUNICATION

Concepts of development and development communication, Introduction to the theories of development communication, Information as a measure of Development, Edutainment and Infotainment – media development

UNIT 3: THEORIES OF DEVELOPMENT COMMUNICATION

Theories of Development, Theory of Modernization, Diffusion of Innovation theory, Theory of Dependency, Meaning and importance of Paradigms, Types of Paradigm- Dominant Paradigm, Criticisms of Dominant Paradigm, Alternate Paradigm

UNIT 4: DIFFERENT STRATEGIES IN DEVELOPMENT COMMUNICATION

Positive Communication Strategies, IECM Strategies, Development Communication Strategies, Communication Strategy Framework, Mass Media and Extension Approach for Development Communication, Planned Development Communication, Public Dialogue Strategy, Negative Communication Strategies, Social Marketing

UNIT 5: DEVELOPMENT COMMUNICATION IN INDIA

Relevance of Development Communication in India, Democratic Decentralization, Narrowcasting, Panchyati Raj (PR) Institutions, A Brief background of the PR system, Key Objectives

UNIT 6: DISSEMINATING INNOVATION

Diffusion of Innovation, Important stages in the diffusion of innovations, Media used for diffusion, Development Support Communication, Participatory Development Communication, Communication Information Media and Education (CIME), Government's efforts in the Indian Context, Role of media in the process of development and nation building

UNIT 7: RURAL AND AGRICULTURE COMMUNICATION

Rural development, Agricultural Communication, Media campaigns for development, diffusion of innovation, extension studies

UNIT 8: DEVELOPMENT REPORTING

Importance of Development Reporting, Present Trends in Development Reporting, Early Indian Experiments in Development Communication

UNIT 9: MEDIA AND DEVELOPMENT

Media and National Integration, Media in Development, Pillar of Democracy, Media in Crisis Situations, Public Service Broadcasting (PSB), Media as a Leader of the Society, Gandhian Model of Development

UNIT 10: USE OF TRADITIONAL AND FOLK MEDIA FOR DEVELOPMENT COMMUNICATION

Traditional folk media, Advantages of Traditional Folk Media, Folk Media reflects social changes, Traditional Folk Media as Development Media: case studies, role of government and third sector agencies.

Reading List

- Gupta, V.S. (2000), Communication and Development, Concept Publishing Company, New Delhi
- Kumar, Keval J. (2007), Mass Communication in India, Jaico Publishing House, Mumbai
- Mody, Bella (1991), Designing Messages for Development Communication, Sage Publications, New Delhi
- Menon, Mridula (2004), Development Communication and Media Debate, Kanishka Publishers, Distributors, New Delhi
- Murthy, D V R (2006), Development Journalism, Kanishka Publishers, Distributors, New Delhi
- Narula, Uma (2006), Communication Models, Atlantic Publishers & Distributors, New Delhi
- Pushkar, Niranjana (2009), Development Communication, Authorspress, New Delhi
- Prasad, Kiran (2009), Communication for Development (Volume I & II), B.R. Publishing Corporation, New Delhi

IDC 205

Perspectives on Indian Economy

Course Objectives

- To provide knowledge on different aspects of the Indian economy
- Help to analyse the service sector growth and recent important issues in the Indian economy

Course Outcomes

- This course will enable the learners to explain various important aspects of the Indian economy
- This course will also help the learners to analyse the different factors relating to the recent service sector growth and other important issues in the Indian economy

Syllabus

UNIT 1: INDIAN ECONOMY: ITS BASIC CHARACTERISTICS, DEVELOPMENT AND GROWTH

Indian Economy in the pre-independence period, Characteristics of India as a developing economy; Emerging Issues of development in the Indian economy National Income: Trends, size and Composition

UNIT 2: POPULATION AND HUMAN RESOURCES

Size, and growth of Population; Characteristics of the population: sex ratio, age composition, density, rural-urban ratio and occupational distribution. Indicators of Human Development: Life Expectancy, Infant Mortality and Literacy

UNIT 3: INFRASTRUCTURE IN THE INDIAN ECONOMY

Infrastructural Facilities in India: Energy, Power, Transport and Communication, Urban Infrastructure in India, Industrial Corridor and Smart Cities

UNIT 4: INDIAN AGRICULTURE & GREEN REVOLUTION

Role of agriculture in Indian economy; Nature of India's agriculture; Trends in Agricultural Production and Productivity; Factors Influencing Productivity; The new agricultural strategy and the Green Revolution; Impact of Green Revolution

UNIT 5: AGRICULTURAL FINANCE, RURAL CREDIT AND AGRICULTURAL MARKETING

Need for agricultural finance; Sources; Role of Rural co-operatives; commercial banks and Regional rural banks; Role of NABARD. Agricultural marketing: Concept and basic requirements; Limitations of agricultural marketing; Role of the Government in promoting agricultural marketing

UNIT 6: FOOD SECURITY AND PUBLIC DISTRIBUTION SYSTEM IN INDIA

Concept of Food Security; Salient Features of Food Security Act 2013, Public Distribution Systems and Its Impact on Poverty; Problems of the PDS and Suggestive Measures

UNIT 7: INDIAN INDUSTRY – DEVELOPMENTAL EXPERIENCE

Strategy of Industrial Development in India; Industrial Development since Independence; Problems of Industrialisation in India; Industrial Policy Resolution, 1956; New Industrial Policy, 1991; Recent Policy Reform Measures in Initiated in the Industrial Sector

UNIT 8: THE ROLE OF THE TERTIARY SECTOR IN THE INDIAN ECONOMY

Changing role of the Tertiary Sector in the Indian Economy; The Recent Growth of the IT and other service sectors; Major Issues in faced by the Service Sector and Suggestive Policy Measures

UNIT 9: UNORGANISED SECTOR, LABOUR PROBLEMS AND LABOUR POLICY

Unorganised Sector and India's Informal Economy; Size and Features; Major Issues; Suggestive Measures; Present Status of Agricultural Labours in India; Major Recommendations of the National Commission on Rural Labour; Features of Industrial Labour; Trade Union Movement in India; Settlement of Industrial Disputes; Social Security Measures introduced for the welfare of the labours; Problems in the Labour Market and Suggestive Measures.

UNIT 10: PLANNING FOR DEVELOPMENT

Economic Planning in India; Overall Objectives of Economic Planning; Overall Achievements and Failures of Economic Planning; The Current Five Year Plan: Objectives and Targets Major Objectives, Targets and Achievements of the Last Five Year Plan; Critical Assessment.

UNIT 11: ECONOMIC REFORMS AND GLOBALISATION

Economic Crisis prior to 1991 Economic Reforms; New Economic Policy of 1991; Indian Economy since Economic Reforms

Reading List

- Agarwal, A.N. (2015): *Indian Economy: Problems of Development and Planning*, Ed., New Age International.
- Datt and Mahajan (2015): *Indian Economy*, 71st Ed., S. Chand & Co. Ltd.
- Dhingra, I. C. (2014): *Indian Economy: Environment and Policy*, Sultan Chand & Sons
- Kapila, U (2015): *Indian Economy: Performance and Policies*, 15th Edition, Academic Foundation.
- Misra and Puri (2016): *Indian Economy: Its Development Experience*, 31st Ed., Himalaya Publishing House.

IDC 206

Introduction to Ethics

Course Objectives

- To help the learners to know the important issues in moral sense
- To help the learners to explore the basic education of human life through the different issues of ethics
- To help the learners to determine the issues of what is good or right and bad or wrong

Course Outcomes

- Will know the meaning of ethics and moral philosophy
- Will know the different theories of ethics and will know the difference between normative ethics, meta-ethics and applied ethics
- Will help people to lead a better and ethical life, which will finally create some ethical human resource for the society.

Syllabus

UNIT 1: NATURE AND SCOPE OF ETHICS

Definition of Ethics, Nature of Ethics, Scope of Ethics

UNIT 2: THE CONCEPT OF MORALITY

Definition of Morality, The Nature of Morality, Different Moral Concepts, Moral theory

UNIT 3: FACT AND VALUE

What is fact, What is value, Classification of values, Distinction between fact and value

UNIT 4: MORAL CONCEPTS

Good, Right, Duty, Virtue, Good, Right, Duty, Virtue

UNIT 5: THEORIES OF MORAL STANDARD: HEDONISM

Hedonism in Moral Philosophy, Classification of Hedonistic Theories, Psychological Hedonism, Critical Comments on Psychological Hedonism, Ethical Hedonism, Critical Comments on Ethical Hedonism, Egoistic Ethical Hedonism, Gross Egoistic Ethical Hedonism, Refined Egoistic Ethical Hedonism, Criticism, Altruistic or Universalistic Gross Hedonism: Bentham, Criticism, Altruistic or Universalistic Refined Hedonism : J. S. Mill, Criticism

UNIT 6: UTILITARIANISM: BENTHAM AND MILL UTILITARIANISM

Historical Background of Utilitarianism, Bentham and his Philosophy, Universalistic Hedonism, Bentham's View of Utilitarianism, Principle of Utility is the Basis of Legal and Social reforms, Criticism, Mill's Life and Works, Mill and Hedonism, Mill's Utilitarianism, Bentham and Mill

UNIT 7: FREEDOM AND DETERMINISM

Determinism: Its Meaning, Arguments in Support of Determinism, What is Freedom or Free Will, Arguments In Support of Free Will, Brief Note On Predestination, Fatalism and Scientific Determinism, The Case Of Freedom and Determinism

UNIT 8: TELEOLOGICAL ETHICS AND DEONTOLOGICAL ETHICS

Normative Ethics and its difference from other three types of ethics, Types of Normative Ethics, Differences between Deontological and Teleological ethics, Critical Evaluation

UNIT 9: PURUSARTHA

Artha, Kama, Dharma, Moksha, Four Basic Sciences

UNIT 10: THEORIES OF PUNISHMENT NOTION OF CRIME AND PUNISHMENT

Theories of Punishment, Deterrent Theory, Reformatory Theory, Retributive Theory, Capital Punishment

UNIT 11: META-ETHICS: ITS NATURE AND DISTINCTION FROM NORMATIVE ETHICS

What is Meta-ethics, Ethical Naturalism, Ethical Non-Cognitivism, Ethical Non-Naturalism (Intuitionism) , What is Normative ethics? Teleological Ethics, De-ontological Ethics, Virtue Ethics, Difference between Meta-Ethics and Normative Ethics

Reading list

- S.P. Sharma: *Nature and Scope of Ethics*
- Ravi, I: *Foundations of Indian Ethics*
- J.N. Sinha: *A Manual of Ethics*
- J.N. Mohanty: *Classical Indian Philosophy*
- I.C. Sharma: *Ethical Philosophies of India*
- J.N. Mohanty: *Explorations in Philosophy*
- P. Benn: *Ethics: Fundamentals of Philosophy*

IDC 207

Understanding Social Problems

Learning Objectives

This course intends to:

- enable the learners to understand about different types of Social Problems and the various problems existing in our society
- enable the learners to know about the meaning and significance of social welfare along
- enable the learners to know the various social welfare measures undertaken by the government as well as nongovernmental organisations for the benefit of the society

Learning Outcomes

- After going through this course, the learners will be able to:
- Understand about different types of Social Problems and the various problems existing in our society
- Know about the meaning and significance of social welfare along
- Know the various social welfare measures undertaken by the government as well as nongovernmental organisations for the benefit of the society

Syllabus

UNIT 1: SOCIAL PROBLEM

Meaning and nature, characteristics, causes, types and approaches

UNIT 2: CRIME

Meaning and Concept, characteristics and type Crime

UNIT 3: POPULATION EXPLOSION AND ILLITERACY

Meaning; Trends and Patterns of Population Explosion, Causes of Overpopulation, Effects of Overpopulation in India, India's population policy, Meaning of Illiteracy, types of illiteracy, Causes of illiteracy, consequences of illiteracy, Illiteracy in Assam

UNIT 4: POVERTY AND UNEMPLOYMENT

Meaning, causes and measures to control poverty; meaning types and consequences of unemployment

UNIT 5: YOUTH UNREST

Meaning, types and causes of Youth Unrest

UNIT 6: SOCIAL PROBLEMS RELATING TO WOMEN

Prostitution, dowry, violence against women

UNIT 7: SUPERSTITIONS

Meaning, Causes and Effect of superstition

UNIT 8: CHILD LABOUR AND CHILD ABUSE

Meaning, types and causes of child labour child abuse

UNIT 9: PROBLEMS OF THE BACKWARD CLASSES

Socio-economic Problems of the SCs, STs and OBCs, Policies and measures to solve the Problems

UNIT 10: TERRORISM

Concept, Origin, Development, causes and consequences of terrorism

UNIT 11: SOCIAL PROBLEMS AND SOCIAL WELFARE

Meaning, importance, nature and scope

Reading List

- Beteille, Andre, 1992, Backward classes in Contemporary India, New Delhi
- Berreman, G. D. 1979, Caste and other inequalities: Essays in inequality, Meerut: Folkore Institute.
- Dube, Leela. 1997. Woman and Kinship. Comparative perspective on Gender in South and Southeast Asia. New Delhi: Sage Publications.
- Gadgil, Madhav and Guha, Ramchandra. 1996. Ecology and Equity: The Use and abuse of nature in Contemporary India. New Delhi. OU

IDC 208

Introduction to History of Assam

Course Objectives

The main objective of this course is to

- Introduce the learners with the historical processes of Assam
- Provide an understanding of the state formation in Assam in the ancient and medieval time
- Give an idea about the cultural and architectural development of the region under different political regime
- Situate Assam in the freedom struggle of India

Course Outcomes

After completing the course

- Learners will be introduced to the historical events and processes of Assam
- Learners will be able understand the state formation process of Assam
- Learners will acquire the knowledge of cultural and architectural progress of the specific period
- Learners will able to analyse the role of Assam in the freedom struggle of India

Syllabus

UNIT 1: SOURCES OF ANCIENT ASSAM

Literary Sources, Archaeological Sources, Foreign Sources

UNIT 2: LEGENDARY PERIOD

Naraka and his successors, Different stories of Naraka

UNIT 3: RULING DYNASTIES OF ANCIENT ASSAM

Varmanas, Salastambhas, Palas

UNIT 4: SOCIETY, ECONOMY, RELIGION AND ADMINISTRATION OF ANCIENT ASSAM

Social Condition, Economic Condition, Religious Condition, Administrative System of Ancient Assam

UNIT 5: SOURCES OF HISTORY OF MEDIEVAL ASSAM

Literary Sources, Archaeological Sources, Foreign Sources

UNIT 6: THE AHOMS

Origin of the Ahoms, Advent of the Ahoms, Events from 1228 A.D. to 1826 A.D.

UNIT 7: THE KOCHES

Origin of the Koches, VisvaSimha, Naranarayan, Partition of the Koch Kingdom

UNIT 8: SOCIETY, ECONOMY, RELIGION AND ADMINISTRATION OF MEDIEVAL ASSAM UNDER THE AHOMS

Social condition, Economic condition, Religious beliefs, Neo-Vaishnavite Movement, the Ahom system of Administration-the Paik System

UNIT 9: ESTABLISHMENT OF THE BRITISH RULE AND ANTI-BRITISH MOVEMENTS

Anglo-Burmese Wars, Treaty of Yandaboo and British Conquest of Assam, British Administrative Set Up, Revolt of 1857

UNIT 10: SOCIO-ECONOMIC TRANSFORMATION OF ASSAM DURING COLONIAL PERIOD

Changes in the Economic Structure, Agrarian Revolts, Social transformation of Assam towards modern age

UNIT 11: EMERGENCE OF POLITICAL CONSCIOUSNESS

Rise of Assamese Nationalism, Establishment of different organisations

UNIT 12: PARTICIPATION OF ASSAM IN THE NATIONAL MOVEMENT

Partition of Bengal and its Impact, the Non Co-operation Movement in Assam, Civil Disobedience Movement and Assam, Quit India Movement in Assam, Grouping Controversy and Independence

Reading List

- Barpujari, H.K.(2003): The Comprehensive History of Assam, Vol. I, Vol. II, Vol.III, Vol. IV& Vol. V, 2nd ed., Publication Board Assam, Guwahati
- Baruah, S.L.,(2004): A Comprehensive History of Assam, 3rd ed., Munshiram Manoharlal, Delhi
- Bhuyan, A.C., (1999): Political History Assam, Publication Board Assam, Vol. I, II, III, 2nd ed., Guwahati
- Dutt, K.N (1993): Landmarks in the Freedom Struggle in Assam, Lawyers' Book Stall
- Gait, E.,(2004): A History of Assam, Eastern Book House, Revised, Guwahati
- Saikia Rajen (2000): Social and Economic History of Assam 1853-1921, Munshiram Manoharlal, Delhi

IDC 301

English for Professional Studies

Learning Objectives

The objectives of the course are to:

- provide a general introduction to some important grammatical concepts
- take up various aspects of English Grammar such as Vocabulary and Punctuation
- highlight some of the common errors made in English Grammar and its correct use
- provide a detailed study on the areas of writing and communication skills in professional context
- To engage the learner in developing skills of office management and correspondence, business communication and presentation of curriculum vitae

Learning Outcomes

- After going through the course, the learner will be able to:
- revise some of the important grammatical concepts
- develop a good idea on various aspects of English Grammar such as Vocabulary and Punctuation
- gain a broad idea on the areas of writing and communication skills
- develop skills of office management and correspondence, business communication and presentation of curriculum vitae
- groom himself or herself with sound communication and professional skills

Syllabus

UNIT 1: SOME CONCEPTS OF GRAMMAR I

English Grammar: An Introduction, Nouns- Kinds of Nouns, Forms of Nouns, Functions, The Noun Phrase, Agreement, Determiners – Articles, Demonstratives, Possessives, Quantifiers, Wh-determiner, Pre-determiners, Verb Forms

UNIT 2: SOME CONCEPTS OF GRAMMAR II

Adjectives, Adverbs, Prepositions

UNIT 3: VOCABULARY

Synonyms and Antonyms, One word Expression, Words Used as Different Word Classes, Phrasal Verbs, Distinction between Similar Words Often Confused

UNIT 4: PUNCTUATION, SYNTHESIS AND TRANSFORMATION OF SENTENCES

Introduction, Punctuation, Synthesis of Sentences, Transformation of sentences

UNIT 5: COMMON ERRORS AND PHRASES AND IDIOMS

Introduction, Common Errors, Phrases and Idioms

UNIT 6: NOTE MAKING

Note making and note taking, Skimming and Scanning, Format of note making, Samples

UNIT 7: COMMUNICATION

Defining Communication, Significance and Process of Communication, Communication Network, Communication Media or Methods, Barriers To Communication, Effective Communication.

UNIT 8: INTRODUCTION TO OFFICE MANAGEMENT

Meaning of Office, Introduction to Office Management, Functions of Office, Relationship of Office with Other Departments, Office Accommodation, Layout and Environment, Office Furniture and Stationery, Office Correspondence and Filing System

UNIT 9: CORRESPONDENCES

Letter Writing, How to Write a Letter, Format of an Official/Business Letter

UNIT 10: PRESENTATION

Writing Executive Summaries, Making a Formal Presentation

UNIT 11: WRITING CURRICULUM VITAE/RESUME

Difference between CV and Resume, Tips for writing CV/Resume, Essentials for writing CV/Resume, Facing Interviews based on CV/Resume, Telephonic Interviews based on CV/Resume

Reading List

- Aggarwala, N.K. (2001). Essentials of English Grammar and Composition, New Delhi: Goyal Brothers.
- Brown, M. Henry. (1977). The Contemporary College Writer. New York: D Van Nostrand Company.
- Chal, Harold Hoontz (1986). Essentials of Management. McGraw Hill Book Company: New York.
- Chopra, R.K. Office Management. Himalaya Publishing House.
- De Sarkar, P.K. (2007). Higher English Grammar and Composition, Kolkata; Book Syndicate Limited.
- Dowerah, Sawpon. A Students' Grammar of English. Guwahati: Students' Stores.
- Lewis, Roger. (1979). How to Write Essays. Heinemann & National Exnt. College, London.
- Sherlekar, S.A. (1984). Principles of Management. Bombay: Himalaya Publishing House

IDC 302

Economics of Education

Course Objectives

To make the learners aware about:

- The meaning, importance and scope of economics of education
- Educational expenditure as productive consumption and returning investment through the function of human capital and planned manpower development.
- The concept and relationship between input and output of education
- The financial resource management.

Learning Outcomes

After going through this course, the graduates will be able to:

- acquire knowledge and understanding on the subject like economics of education
- develop the basic understanding on the emerging issues of economics of education
- know the basic knowledge regarding the various core courses of Education as a subject as a whole.
- gather the procedural knowledge which are required for performing multidisciplinary and skill based programmes in the 21st century
- Produce efficient and effective leaders in the field of teaching, educational administration and educational finances
- acquire the cognitive and technical skills for performing and accomplishing complex tasks relating to the subject on education and other interdisciplinary courses
- Produce quality educational practitioners having sound knowledge of various dimensions of economics of education and economic policies

Syllabus

UNIT 1: ECONOMICS OF EDUCATION

Concept, scope and significance

UNIT 2: EDUCATION AND ECONOMIC DEVELOPMENT

Concept, relationship between education and economic development

UNIT 3: ECONOMICS OF EDUCATION POLICY

Nature of economic policy, education as a Public Good

UNIT 4: EDUCATION AS A PUBLIC GOOD

Meaning of public good, difference between public goods and private goods, education as public good, education as mixed good, education as merit good

UNIT 5: HUMAN CAPITAL FORMATION

Concept, Human capital Approaches to education

UNIT 6: EDUCATION AND MANPOWER PLANNING

Education and manpower planning, manpower planning and economic growth, problems of manpower planning in India

UNIT 7: FINANCING IN HIGHER EDUCATION AND TECHNICAL EDUCATION

Pattern of financing, need of financing, financial policy for higher and technical education in India

UNIT 8: LIVELIHOOD, LABOUR MARKET AND LABOUR MOBILITY

Sectoral growth, unemployment and underemployment, labour mobility in northeast India

UNIT 9: EDUCATION AND BRAIN DRAIN

Concept, factors for brain drain, out-migration of the skilled personnel

UNIT 10: ACCESS AND EQUITY IN EDUCATION

Meaning of equity, improving access in education and reservation policy in education in India

UNIT 11: SELF-FINANCING AND FUND MOBILIZATION IN THE EDUCATIONAL INSTITUTIONS

Fund mobilization in the educational institution

Reading List

- Hunter, W.W.: Economic History of India, Vols.2, Cosmo Publication, 2008
Habison & Myers: Education, Manpower and Economic Growth
Peer, M.: Higher Education and Employment, Rawat Publications, 2007-08
Rao, P.: Economics of Primary Education, Rawat Publication, 1998.
Rajaiah, B.: Economics of Education
Singh, R.P.: Educational Finance and the Planning Challenge, Eastern Book House, 2008
Shukla, P.D.: New Education Policy in India.
Psachopoulos, Y.: Economics of Education

IDC 303

Business Communication and Media Management

Course Objectives

- To provide understanding of the field of business communication and business journalism
- To acquaint learners with the concept of media management and its role in the society
- To equip learners with necessary skills required to work in the field of business communication

Course Outcomes

On completion of this course, the learners will be able to

- recognize the various contexts in which business communication takes place
- determine the need of business communication and business journalism
- analyse the issues related with the media management
- equip themselves with skills required for a business journalist

Syllabus

UNIT 1: BUSINESS COMMUNICATION

Concept of Business Journalism, Success through proper communication, History of business communication, Need for business journalism, Essential Characteristics of Business Communication, The Benefits of Effective Communication, Present Scenario, Five rules of good writing or communication, Five Ps of marketing mix, Target audience, Specific Characteristics of a Target Audience, Consumerist culture

UNIT 2: MEDIA FOR BUSINESS

Concept, Importance of media in business, Types of media, Selection of Appropriate Communication Media, Incorrect choice of Medium, Setting Up business goals, Communication Structure In a Business Organisation, Communication in corporate world, Effective business or economic writing, Importance of writing skills in business communication, Purpose of writing, The Principles of effective writing, Economic newspapers, The Economic Times, The Business standard, Public Relations and Marketing, Ethics in communication, Audience Analysis.

UNIT 3: BUSINESS PRESENTATION-I

Report Writing, Process of Writing a Report, Determining the purpose of the report, Determining the factors, Gathering the information needed, Interpreting the findings, Organizing the report information, Writing the report, Project Report Writing, Criteria of a Good Project, Advantages of a Good Project, Disadvantages of Project Method, Format of a Project Report

UNIT 4: BUSINESS PRESENTATION II

Writing Executive Summaries, Making Business Presentations

UNIT 5: INTRODUCTION TO MANAGEMENT

Concept Of Management, Characteristic of Management, Scope of Management, Evolution Of Management Thought, Management Vs Administration, Levels Of Management, Functions Of

Management, Planning, Organizing, Staffing, Controlling, Coordination, Management Styles in Indian context

UNIT 6: MEDIA MANEAGEMENT

Media as an industry and profession, Importance of media management, Ownership patterns of mass media in India

UNIT 7: MEDIA ORGANISATIONS

Structure of a media organisation, an account of different national and international media and communication organisations

UNIT 8: ORGANISATONAL STRUCTURE OF A PRINT MEDIA ORGANIZATION

Organizational structure of print media establishments, Editorial Department, Business Department, Production Department, Reference Section, Role and coordination among the different departments, Printing, Packaging, Transportation and Distribution

UNIT 9: ORGANISATIONAL STRUCTURE OF AN ELECTRONIC MEDIA ORGANIZATION

Electronic media organization, News and programme sections, News section in a radio station, News section in a TV station, Programme section in TV and radio, Electronic News Gathering (ENG), Electronic Field Production (EFP), Personnel involved in production and news, Viewership/ Listenership, Content creation and role of advertising, Genre or types of programmes, Types of programmes in radio, Types of programmes in TV

UNIT 10: LEADERSHIP AND WORK MOTIVATION

Importance of leadership in a media organisation, job performance, impact of technology on the performance of the employees, division of labour

Reading List

Chaturvedi, P.D, Mukesh Chaturvedi (2006), Business Communication, Dorling Kindersley (India) Pvt Ltd, New Delhi

Chaturvedi, B.K (2009), Media Management, Global Vision Publishing House, New Delhi

Kumar, Dr. Rakesh (2010), Media Management, Surendra Publications, New Delhi

Lesikar, Raymond, V. , Marie E. Flayley (2005), Basic Business Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi

Narula, Uma (2006), Business Communication Practices, Atlantic Publishers & Distributors, New Delhi

Riel, Cees B.M. van, Charles J. Fombrun (2007), Essentials of corporate Communication, Routledge, UK

Soori, Sanjeev (2010), Business Journalism, Axis Publications, New Delhi

Taylor, Shirley (2005), Communication for Business, Dorling Kindersley (India) Pvt Ltd, New Delhi

Yadav, K.P (2006), Media Management, Adhyayan Publishers & Distributors, New Delhi

IDC 304

Understanding North East India

Learning Objectives

This course intends to:

- enable the learners to know about the north-eastern region of India.
- enable the learners to understand the features and concerns that are common to all the eight states of this region

Learning Outcomes

After going through this unit, the learner will be able to:

- Know about the north-eastern region of India.
- Understand the features and concerns that are common to all the eight states of this region

Syllabus

UNIT 1: THE CONCEPT OF NORTHEAST INDIA

Northeast India in the Ancient, Colonial and Post period

UNIT 2: LOCATION AND ECOLOGY OF NORTHEAST INDIA AND ASSAM IN PARTICULAR

Location; Boundaries; Ecology of Northeast India; Flora, Fauna, Rare species and Ecological Hotspots

UNIT 3: STATE FORMATION DURING POST-INDEPENDENCE PERIOD

Creation of different states and Autonomous Councils

UNIT 4: DEMOGRAPHIC COMPOSITION OF NORTHEAST INDIA

Racial; Linguistic; Caste; Religious; Tribal groups of Assam

UNIT 5: SOCIAL INSTITUTIONS AMONG THE MAJOR TRIBAL GROUPS OF THE NORTH EASTERN STATES

Family, Marriage and Kinship; Religion, Economy and Polity among the major tribal groups of the north eastern states

UNIT 6: IMMIGRATION TO NORTHEAST INDIA AND ASSAM IN PARTICULAR

Immigrant groups, Occupation; Consequences of Immigration; Insider versus Outsider feuds

UNIT 7: ETHNIC IDENTITY IN NORTHEAST INDIA

Ethnicity: Meaning and Characteristics; Intercommunity relations and its changing nature; Ethnic Conflict

UNIT 8: INSURGENCY IN NORTHEAST INDIA

Origin and Development of insurgency in the region; Major insurgent groups

UNIT 9: LAND RELATION IN NORTHEAST INDIA

Land holding patterns, agrarian structure

UNIT 10: ECONOMIC PROBLEMS IN NORTH EAST INDIA

Unemployment, Infrastructure, Industrialization

UNIT 11: DEVELOPMENT IN NORTHEAST INDIA

North Eastern Council (NEC), The Ministry of Development of North Eastern Region (MDoNER), Look East Policy

Reading List

Baruah, Sanjib, 2005, Durable Disorder: Understanding the Politics of North East India, New Delhi: Oxford University Press.

Bordoloi, B. N., 1990, Constraints of Tribal Development in North-East India, Guwahati: Tribal Research Institute.

Fernandes, Walter and Gita Bharali, 2011, Uprooted for whose benefits-Development induced displacement in Assam-1947-2000, Guwahati: North Eastern Social Research Centre.

Fernandes, Walter and Sanjay Barbora, 2008, Tribal Land Alienation in the Northeast; An Introduction: An Introduction in Walter Fernandes and Sanjay Barbora (ed) Land, people and politics: Contest Over Tribal Land in Northeast India, Guwahati and Denmark: North Eastern Social Research Centre and International Workgroup for Indigenous Affairs, pp 1-15.

Goswami, Atul; August, 1984; Tribal Development with special Reference to North-East India in Social Scientist ; vol12, no8; pp 55-60.

Hussain, Monirul, 2008, Interrogating Development: State, Displacement and Popular Resistance in North East India, New Delhi: Sage Publication.

Karna, M. N. 1990, The Agrarian Scene in Seminar, vol 366, pp 30-37.

Karna, M.N., 1999, Ethnic identity and Socio-economic Processes in North-east India in Kailash S. Aggarwal edited Dynamics of Identity and Intergroup relations in North-east India, IAS-Shimla, pp29-38.

IDC 305

Rural Development in India

Course Objectives

- Acquaint learners with the concept, nature and characteristics of rural society.
- Make the familiar with the causes of Rural Backwardness, Rural Problems, and prospectus of rural life.
- Conceptualise them with nature of the rural consumer, rural finance and rural credit.

Course Outcomes

- Analyse the concept, indicators and strategies of Rural Development.
- Inculcate the knowledge of Rural society and culture
- Evaluate problems of rural society and draw reasonable conclusion thereof.
- Develop understanding of various credit, loan and saving approaches for rural society.

Syllabus

UNIT 1: BASIC CONCEPTS OF RURAL DEVELOPMENT

Concept of Rural Development; Why Rural Development?, Some Dilemmas in Development – Rural Vs Urban Development, Agriculture Vs Industrial Development, Capital Vs Labour Dogma, Autonomous Vs Induced Development

UNIT 2: RURAL ECONOMY OF INDIA

Size and Structure of the Indian Rural Economy; Importance and Role of the Rural Sector in India; Economic, social and Demographic Characteristics of the Indian Rural Economy; Causes of Rural Backwardness (Indian Context)

UNIT 3: APPROACHES TO RURAL DEVELOPMENT

Community Development Programmes; Gandhian Approach to Rural Development; Balancing Rural and Urban Development

UNIT 4: COTTAGE INDUSTRIES IN INDIA

Role of Cottage Industries in Indian Economy; Various Cottage Industries of India; Government Policies for Cottage Industries

UNIT 5: RURAL INDEBTEDNESS IN INDIA

Meaning; Nature; Consequences of Rural Indebtedness; Programmes for Removal of Rural Indebtedness

UNIT 6: RURAL UNEMPLOYMENT IN INDIA

Characteristics; Incidence of Rural Unemployment in India; Employment Generation Measures

UNIT 7: POVERTY IN RURAL INDIA

Characteristics; Incidence of Rural Poverty in India; Poverty Eradication Measures

UNIT 8: ROLE OF TECHNOLOGY IN RURAL DEVELOPMENT

Importance of Rural Technology in Agriculture and Allied Sectors; Issues with Use of Technologies

UNIT 9: ROLE OF COMMERCIAL BANKS IN RURAL FINANCE IN INDIA

Progress of Commercial Banks; Priority Sector Lending; The Lead Bank Scheme; Analysis of Major Schemes of the Government of India undertaken since 1990 in different sectors – Agriculture, Animal Husbandry, Fishery, Cottage Industries; Difficulties faced in Implementation of these Schemes

UNIT 10: REGIONAL RURAL BANKS

Objectives and Functions of RRBs; Evaluation of Progress and Activities of RRBs; Critical Assessment of Functions of RRBs

UNIT 11: NABARD

Objectives and Functions of NABARD; Evaluation of Progress and Activities of NABARD; Critical Assessment of Functions of NABARD

Reading List

- Arora ,R.C., K.(1979): Integrated Rural Development, S. Chand & Co.
Datt and Mahajan (2015): Indian Economy, 71st Ed., S. Chand & Co. Ltd.
Reddy, K. V.(2007):Rural Development in India (Poverty and development):Himalaya Publishing House.
Singh, K.(2010):Rural Development: Principles, Policies and Management, Sage Publications India Pvt. Ltd.
Sisodia, Y. S.(2007): Rural Development: Macro-Micro Realities, Rawat Publications.
Sundaram, I.S.: Rural Development. Himalaya Publishing House

IDC 306

Essentials of Indian Philosophy

Course Objectives

- To help the learners to know the Indian context of education in spiritual, religious and moral sense
- To help the learners to explore the basic education of human life through the systems of Indian philosophy

Course Outcomes

- To know that Indian philosophy shows us different paths to realize the highest truth in life under different schools
- Will know that Indian philosophy is essentially spiritual in nature
- Will know the different āstika and nāstika schools of Indian Philosophy

Syllabus

UNIT 1: THE NATURE AND SCOPE OF INDIAN PHILOSOPHY

Nature of Indian Philosophy, Scope of Indian Philosophy

UNIT 2: CARVAKA – EPISTEMOLOGY

Accidentalism and naturalism, The denial of inference, The denial of the validity of the Vedas

UNIT 3: BUDDHISM – FOUR NOBLE TRUTHS

A Brief Sketch of Buddhism, Concept of Four Noble Truths, There is Suffering, There is a Cause of Suffering, Dependent Origination, The Cessation of Suffering, Concept of Nirvana, The Path of Cessation of Suffering

UNIT 4: JAINISM – SYADVADA

A brief account of Jainism: Jaina Epistemology, Jaina Metaphysics, Syadvada or The Sapta-bhangi-naya, Criticism of Syadvada, Let us sum up

Unit 5: Nyaya – Concept of Prama

Definition of prama, Nyaya: Sources of knowledge, Anuman, Inference, Upamana, Testimony

UNIT 6: VAISESIKA – DRAVYA, GUNA, SAMANYA

Vaisesika Epistemology, Valid Knowledge, Invalid Knowledge, Kinds of Categories: What they are? Substance, Quality, Generality, Non-existence

UNIT 7: SAMKHYA – PURUSA & PRAKRTI

Nature and Characteristics of Prakrti, Proofs for the existence of Prakrti, Prakrti and the Gunas, Different products of Prakrti, Teleological Evolution, Criticism of the evolution theory, Nature and Characteristics of Purusa, Proofs for the existence of Purusa, Plurality of Purusa

UNIT 8: YOGA – THE CONCEPT OF CITTA-VRITTI

Brief Description on Yoga philosophy, Concept of Citta-Vritti, Astāṅga Yoga

UNIT 9: MIMAMSA – INTRINSIC VALIDITY OF KNOWLEDGE

Nature of Valid knowledge, Mimamsaka theory of Svatahpramanyavada, Nyaya theory of Paratahpramanyavada, Paratahpramanyavada and Svatahpramanyavada: A Comparison

UNIT 10: SAMKARA – BRAHMAN AND MAYA

Avdaita Vedānta, The Concept of Brahman, Nature of Brahman, Svarupalaksana of Brahman
Tatastha Laksana of Brahman, NetiNeti Concept of Brahman, Meaning of Māyā, Māyā is a fact
of experience, The two functions of Māyā, Nature of Māyā

UNIT 11: RAMANUJA – GOD

Ramanuja's Concept of God, Significance of God, God is qualified (visista), God is
Trisatvatmaka, God has internal distinction (SvagataBheda), Aprthakasidhi, God is the cause of
the world, Ramanuja's concept of God (Thesim), Forms of God, Archa, Vibhava,
VyuhaSusksamaAntaryami

Reading list

S. Dasgupta: A History of Indian Philosophy
J. N. Sinha: Indian Philosophy
Radhakrishnan: Indian Philosophy
C.D. Sarma: A Critical Survey Of Indian Philosophy
S.Chatterjee: An Introduction to Indian Philosophy

Detailed Syllabi of Ability Enhancement Courses (AECs)

AEC 101 General English

Learning Objectives

The objectives of the course are to:

- introduce the learner to various poetical works written by some of the major English poets
- introduce a play written by the English dramatist William Shakespeare
- encourage the learner towards learning important techniques of comprehension and intelligent reading

Learning Outcomes

After going through the course, the learner will be able to:

- study the various poetical works written by some of the major English poets
- grasp the textual content and message contained in them
- appreciate the play Macbeth written by William Shakespeare
- discuss some important concepts of comprehension and intelligent reading

Syllabus

UNIT 1: WILLIAM BLAKE: "HOLY THURSDAY"

William Blake: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 2: WILLIAM COWPER: "THE SOLITUDE OF ALEXANDER SELKIRK"

William Cowper: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 3: WILLIAM WORDSWORTH: "SIMON LEE"

William Wordsworth: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 4: ALFRED TENNYSON: "TEARS IDLE TEARS"

Alfred Tennyson: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 5: W.B. YEATS: "AN IRISH AIRMAN FORESEES HIS DEATH"

W. B. Yeats: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 6: D.H. LAWRENCE: “THE SNAKE”

D.H. Lawrence: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 7: KEKI N. DARUWALLA: “WOLF”

Keki N. Daruwalla: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 8: CHINUA ACHEBE: “AS ONE LISTENS TO THE RAIN”

Chinua Achebe: Life and Works, Text of the Poem, Explanation of the Poem, Style and Language

UNIT 9: WILLIAM SHAKESPEARE: MACBETH I

William Shakespeare: Life and Works, Background of the Play

UNIT 10: WILLIAM SHAKESPEARE: MACBETH II

Explanation of the Text, Major Characters, Major Themes, Style and Language

UNIT 11: COMPREHENSION AND INTELLIGENT READING

Comprehension and Intelligent Reading, Reading and Grasping Skills

Reading List

- Aggarwala, N.K. (2001). Essentials of English Grammar and Composition. New Delhi: Goyal Brothers.
- Albert, Edward. (2000). History of English Literature. Fifth Edition. Oxford : Oxford University Press.
- Birch, Dinah. (2009). The Oxford Companion to English Literature. Seventh Edition. Oxford : Oxford University Press.
- De Sarkar, P. K. (2007). Higher English Grammar and Composition. Kolkata: Book Syndicate Limited.
- Dowerah, Sawpon. A Students’ Grammar of English. Guwahati: Students’ Store
- Eastwood, John. (1994). Oxford Guide to English Grammar. Oxford University Press.
- Eckersley & Ekersley. (1960) (ed). A Comprehensive English Guide. Harlow: Pearson Education Limited.
- Palmer, R. F. (1988). The English Verb. Longman Linguistics Library

AEC 201

MIL Assamese

Course Objectives

After going through this course, a learner will be able to:

- Familiar with the writing style of diverse Assamese literary texts
- Discover the underlying spirit of the writing of selected Assamese literary texts
- Develop basic ideas of Assamese grammar

Course Outcomes

After going through this course, a learner will be able to:

- Outline the trends of Assamese poetry, drama, novel, and prose
- Improve the writing style of Assamese

Syllabus

অধ্যায় ১: মাধৱদেৱ - তেজৰে কমলাপতি (বৰগীত)

কবি পৰিচয়, 'তেজৰে কমলাপতি' কবিতাটিৰ পাঠ: শব্দাৰ্থ, বৰগীতৰ সাধাৰণ পৰিচয়, 'তেজৰে কমলাপতি' কবিতাটিৰ আলোচনা: বিষয় বস্তুৰ আভাস, কাব্যিক সৌন্দৰ্য

অধ্যায় ২: চন্দ্ৰকুমাৰ আগৰৱালা: বন কুঁৱৰী

ৰমন্যাসবাদ আৰু ৰমন্যাসবাদী কবিতাৰ বৈশিষ্ট্য, অসমীয়া ৰোমাণ্টিক কবিতাৰ সাধাৰণ আলোচনা, কবিপৰিচয়, 'বনকুঁৱৰী'কবিতাটিৰ পাঠ, 'বনকুঁৱৰী'কবিতাটিৰ আলোচনা: বিষয়বস্তু আৰু মূলভাব, ৰমন্যাসিক চিন্তাৰ প্ৰতিফলন

অধ্যায় ৩: নৱকান্ত বৰুৱা: ইয়াত নদী আছিল

আধুনিক কবিতাৰ পটভূমি, আধুনিক অসমীয়া কবিতা, নৱকান্ত বৰুৱাৰ কাব্য-চিন্তা, 'ইয়াত নদী আছিল'কবিতাটিৰ পাঠ, ইয়াত নদী আছিল: বিষয়বস্তু, সাধাৰণ আলোচনা

অধ্যায় ৪: নিৰ্মলপ্ৰভা বৰদলৈ: মৰ্মান্তিক

নিৰ্মলপ্ৰভা বৰদলৈৰ কাব্য-চিন্তা, 'মৰ্মান্তিক'কবিতাটিৰ মূলপাঠ, মৰ্মান্তিক: বিষয়বস্তু, সাধাৰণ আলোচনা

অধ্যায় ৫: গুৰু-শিষ্যৰ মণি-কাঞ্চন সংযোগ

গুৰু-শিষ্যৰমণি-কাঞ্চনসংযোগ: চৰিত পুথিৰ উদ্ভৱ আৰু বিকাশ, পাঠটিৰ উৎস, মূলপাঠৰ আভাস, বিষয়বস্তুৰ পৰিচয়, মাধৱদেৱৰ ব্যক্তিত্ব, মাধৱদেৱৰ গুৰুভক্তি, গদ্যৰীতি, কঠিন শব্দৰ টোকা

অধ্যায় ৬: বাণীকান্ত কাকতি : নামঘোষা

সাহিত্য সমালোচক বাণীকান্ত কাকতি, নামঘোষাৰ পৰিচয়, পুণ্যশ্লোক শংকৰ-স্মৃতি, মাধৱদেৱৰ আত্মলিপি, নামঘোষাৰ ৰসবিচাৰ

অধ্যায় ৭: লক্ষ্মীনাথ বেজবৰুৱা: কন্যা

লক্ষ্মীনাথ বেজবৰুৱা: কন্যা - লক্ষ্মীনাথ বেজবৰুৱাৰ জীৱন আৰু কৃতি, গল্পটোৰ সাধাৰণ আলোচনা

অধ্যায় ৮: ভবেন্দ্ৰনাথ শইকীয়া: চোৰাসাপ

ভবেন্দ্ৰনাথ শইকীয়া: চোৰাসাপ - ভবেন্দ্ৰনাথ শইকীয়াৰ জীৱন আৰু কৃতি, গল্পটিৰ সাধাৰণ আলোচনা

অধ্যায় ৯: ৰজনীকান্ত বৰদলৈ: মনোমতী

ঔপন্যাসিক ৰজনীকান্ত বৰদলৈ আৰু তেওঁৰ উপন্যাসৰ প্ৰধান বৈশিষ্ট্যসমূহ, মনোমতী উপন্যাসৰ কাহিনীভাগ, ঐতিহাসিক উপন্যাস হিচাপে মনোমতী, মনোমতী উপন্যাসৰ চৰিত্ৰ চিত্ৰণ, মনোমতী উপন্যাসৰ সামাজিক চিত্ৰ

অধ্যায় ১০: জ্যোতিপ্ৰসাদ আগৰৱালা: শোণিত কুঁৱৰী

জ্যোতিপ্ৰসাদ আগৰৱালাৰ পৰিচয়, জ্যোতিপ্ৰসাদ আগৰৱালাৰ নাট্যপ্ৰতিভা, জ্যোতিপ্ৰসাদ আগৰৱালাৰ নাটকৰ বৈশিষ্ট্য, শোণিত কুঁৱৰী নাটকৰ কাহিনী, শোণিত কুঁৱৰী নাটকৰ চৰিত্ৰ, শোণিত কুঁৱৰী নাটকৰ সংলাপ

অধ্যায় ১১: অসমীয়া ব্যাকৰণ

কৃৎপ্ৰত্যয়, তদ্ধিতপ্ৰত্যয়, বিভক্তি: নাম বিভক্তি বা কাৰক বিভক্তি, ক্ৰিয়া বিভক্তি, বিভক্তি আৰু প্ৰত্যয়ৰ পাৰ্থক্য, উপসৰ্গসমাস : দ্বন্দ্বসমাস, দ্বিগুণসমাস, বহুব্ৰীহিসমাস, কৰ্মধাৰয়সমাস, তৎপুৰুষসমাস, অব্যয়ী ভাবসমাস, লিঙ্গ

Reading List

Ahmed, Kamaluddin (2005). Adhunik Asomia Kobita. Guwahati: Banalata

Barua, Birinchi Kumar (1997). Asomia Katha Sahitya. Nalbari: Universal Emporium.

Baruah, Prahlad Kumar (2005). Asomia Chutigalpar Adhyayan. Guwahati: Banalata.

Bharali, Sailen (1993). Upanyash bischar aru bisleshan. Guwahati: Chandra Prakashan.

Bharali, Sailen (2009). Banikanta Kakatirpora Bhaben Barualoi. Guwahati: Chandra Prakashan.

Bora, Mahendra (1985). Sahitya Upakramanika Golaghat: Bharati Book Stall

Deka, Dharmasingha (2007) Rachana Bichitra. Guwahati.

Dutt, Uday (1995).Chutigalpa. Guwahati: Student's Stores.

Gogoi, Leela (Ed.) (2002). Adhunik Asomia Sahityar Porichoy. Guwahati: Banalata.

Goswami, Tralokyanath (2006). Adhunik Galpa Sahitya. Guwahati: Vani Prakash Limited.

Goswami, Upendranath (2007). Asomia Bhasar Byakaran. Guwahati: Mani-Manik Prakasha

Hazarika, Karbi Deka (2008). Assamese poets and poems. Dibrugarh: Banalata.

Mahanta, Baapchandra (Ed.) (2000). Borgeet. Guwahati: Student's Stores.

Majumdar, Bimal (2011). Sahityar Tattwa aaru Prayog. Guwahati: Jyoti Prakashan.

Neog, Maheswar (2000). Asomia Sahityar Ruprekha. Guwahati: Chandra Prakash.

Neog, Maheswar (Ed.) (2004). Snatakar Kathabandha. Guwahati: Guwahati University.

PhukanPatgiri, Dipti (1999) Adhunik Asomia Byakaran. Guwahati: Book Hive.

Rajbangshi, Paramananda (Ed.) (1995). Asomia Natak: Para. Guwahati: Chandra Prakashan.

Sharma, Dalai Harinath (1992). Asomia Gadya Sahityar Gatipath. Nalbari: Padmapriya Library.

Sharma, Satyendra Nath (1997). Asomia Upanyasar Bhumika. Guwahati: Soumar Prakash.

Sharma, Satyendra Nath (2009). Asomia Sahityar Samikshatmak Itibritta. Guwahati: Soumar Prakash

Sharma, Satyendranath (2005). Asomia Natya Sahitya. Guwahati: Soumar Prakash.

Talukdar, Nanda (2006). Kobi aaru Kabita. Guwahati: Banalata.

Thakur, Nagen (Ed.) (2000). Esha Basarar Asomia Upanyash. Guwahati: Jyoti Prakashan.

AEC 202

Alternative English

Learning Objectives

The objectives of the course are to:

- encourage the learners towards exploring various literary texts prescribed in the course
- stir an interest in the learners towards developing an analytical bent of mind in exploring these literary texts
- provide the scope of grasping various thematic concerns, contexts, issues and aspects reflected in the prescribed literary texts

Learning Outcomes

After going through the course, the learner will be able to:

- study the various literary texts prescribed in a detailed manner
- develop an analytical bent of mind in exploring these literary texts
- grasp various thematic concerns, contexts, issues and aspects reflected in the prescribed literary texts
- appreciate the ideas, reflections, literary representations and the core message contained in these texts

Syllabus

UNIT 1: E.P. GEE: “THE RHINO OF KAZIRANGA”

E. P. Gee: Life and Works, Explanation of the Essay, Style and Language

UNIT 2: THE KING JAMES BIBLE: “THE STORY OF CREATION”

The Story of Creation, Major Themes, Style and Language

UNIT 3: SALMAN RUSHDIE: “IMAGINARY HOMELANDS”

Salman Rushdie: Life and Works, Explanation of the Text, Major Themes, Style and Language

UNIT 4: BERTRAND RUSSELL: “PROLOGUE” TO AUTOBIOGRAPHY

Bertrand Russell: Life and Works, Text of the Prologue, Explanation of the Prologue, Major Themes, Style and Language

UNIT 5: MATTHEW ARNOLD: “LITERATURE AND SCIENCE”

Matthew Arnold: Life and Works, Explanation of the Text, Major Themes, Style and Language

UNIT 6: RICHARD KEARNEY: “ON STORIES”

Richard Kearney: Life and Works, Explanation of the Text, Major Themes, Style and Language

UNIT 7: MARTIN LUTHER KING: “I HAVE A DREAM”

Martin Luther: Life and Works, Context of the Speech, Explanation of the Speech, Style and Language

UNIT 8: LORD CHESTERFIELD: LETTER TO HIS SON

Lord Chesterfield: Life and Works, Text of the Letter, Explanation of the Text, Major Themes, Style and Language

UNIT 9: R.L. STEVENSON: EXTRACTS FROM TRAVEL WITH A DONKEY

R. L. Stevenson: Life and Works, Explanation of the Extract, Major Themes, Style and Language

UNIT 10: DEREK WALCOTT: “THE ANTILLES: FRAGMENTS OF EPIC MEMORY”

Derek Walcott: Life and Works, Explanation of the Speech, Major Themes, Style and Language

UNIT 11: ANTOINE DE SAINT EXUPERY: THE LITTLE PRINCE

Antoine de Saint Exupery: Life and Works, The Title of the Novella, The Context of the Novella, Explanation of the Novella

Reading List

- Alfred, Julius Ayer. (1972). Russell. London: Fontana
- Allen, Walter. (1958). The English Novel: A Short Critical History. Penguin Books.
- Birch, Dinah. (2009). The Oxford Companion to English Literature, Seventh Edition. Oxford: Oxford University Press.
- Bloom, Harold. (2003). Bloom’s Modern Critical Views: Derek Walcott. Chelsea House Publishers.
- Edward, Bough. (2006). Derek Walcott. Cambridge University Press
- Humberstone, Barbara. Et al. (2015). Routledge International Handbook of Outdoor Studies, London: Routledge.
- Hudson, W.H. Introduction to Study of Literature. Macmillan
- Kearney, Richard. (2002). On Stories. London: Routledge.
- Page, Norman. The Language of Literature. Casebook Series
- Chatterjee, Partha. (1993). The Nation and its Fragments: Colonial and Postcolonial Histories. New Jersey: Princeton University Press

AEC 301

Life Skills

Course Objectives

The objectives of the course are to:

- Enhance the ability of developing self-knowledge and self-awareness by overcoming all fears and insecurities
- Increase emotional competency and emotional intelligence at the place of study/work
- Provide the opportunity for realizing self-potential through practical examples
- Develop interpersonal skills and adopt good leadership behaviour for self-empowerment and the empowerment of others

Course Outcomes

After successfully completing the course, learners will be able to

- Gain Self-competency and Confidence
- Gain Emotional Competency
- Gain Intellectual Competency
- Gain an Edge through Professional Competency
- Aim for a High Sense of Social Competency
- Imbibe the attributes of an Integral Human Being

Syllabus

UNIT 1: LISTENING AND SPEAKING

Techniques of Effective Listening and speaking, Listening and Comprehension, Probing Questions, Barriers to Listening, Pronunciation, Enunciation, Vocabulary, Fluency, Common Errors

UNIT 2: READING, WRITING AND DIFFERENT MODES OF WRITING

Techniques of Effective Reading, Gathering Ideas and Information from a Given Text, Evaluating and Interpreting the Text; Avoiding Ambiguity, Vagueness, Unwanted Generalizations, and Oversimplification of Issues; Being structured and sequenced; Using Different Modes of Writing like E-mails, Proposal, Recording the Proceedings of Meetings

UNIT 3: DIGITAL LITERACY AND SOCIAL MEDIA, DIGITAL ETHICS AND CYBER SECURITY

Basic Computer Skills on MS Office Suite, MS Excel, MS Word, MS PowerPoint; Basic Virtual Platforms like Zoom, Google Meet, Cisco Webex, MS Teams; Cyber Security and Threats, Vulnerabilities of Cyber Attacks; Digital Ethics, Digital Etiquette and Digital Life Skills

UNIT 4: NONVERBAL COMMUNICATION

Meaning of Nonverbal Communication; Advantages of Using Nonverbal Communication, Modes of Nonverbal Communication like Eye Contact and Facial Expression, Hand Gestures; Do's and Don'ts in NVC

UNIT 5: GROUP DISCUSSION SKILLS AND INTERVIEW SKILLS

Meaning and Methods of Group Discussion; Procedure of Group Discussion; Group Discussion — Common Errors; Meaning and types of interviews; Dress code, background research; Do's and Don'ts; Situation, task, action, and response (STAR concept) for facing an interview; Interview procedure; Important questions generally asked at a job interview; common errors that candidates generally make at an interview

UNIT 6: EXPLORING CAREER OPPORTUNITIES, RÉSUMÉ SKILLS

Knowing yourself — Personal characteristics; Knowledge about the world of work, requirements of jobs, including self-employment; Sources of career information; Preparing for a career based on potential and availability of opportunities; Introduction of résumé and its importance; Difference between a CV, résumé and biodata; Essential components of a good résumé; Common errors while preparing a résumé

UNIT 7: COGNITIVE AND NON-COGNITIVE SKILLS, PRESENTATION SKILLS, AND LISTENING AS A TEAM SKILL

Cognitive Skills: Meaning and Types of Cognitive Skills, Strategies to Develop Cognitive Skills like Critical Thinking Skills, Problem-solving skill; Non-cognitive Skills: Meaning and Types of Non-cognitive Skills; Strategies to Develop Non-cognitive Skills like Empathy, Creativity, Teamwork; Types of Presentations; Knowing the Purpose; Knowing the Audience; Opening and Closing a Presentation; Using Presentation Tools; Handling Questions; Ways to Improve Presentation Skills over Time

UNIT 8: TRUST AND COLLABORATION, BRAINSTORMING, SOCIAL AND CULTURAL ETIQUETTES, INTERNAL COMMUNICATION

Importance of Trust in Creating a Collaborative Team; Spirit of Teamwork; Understanding Fear of Being Judged and Strategies to Overcome Fear; Advantages of Effective Listening; Listening as a Team Member and Team Leader; Brainstorming as a Technique to Promote Idea Generation; Need for Etiquette; Aspects of Social and Cultural/Corporate Etiquette in Promoting Teamwork; Use of Various Channels for Transmitting Information to Team Members

UNIT 9: LEADERSHIP SKILLS, INNOVATIVE LEADERSHIP AND DESIGN THINKING

Understanding Leadership and its Importance; Traits and Models of Leadership; Key characteristics of an effective leader; Leadership styles; Basic Leadership Skills like Motivation, Teamwork, Negotiation, Networking; Concept of emotional and social intelligence; Design thinking and its key elements; Learning through Biographies - Drawing insights on how leaders sail through difficult situations

UNIT 10: MANAGERIAL SKILLS

Basic managerial skills like planning for effective management, organizing teams, recruiting and retaining talent, delegation of tasks, coordinating, managing conflict; Self-management skills like understanding self-concept, developing self-awareness, self-examination, self-reflection and introspection, self-regulation, managing personal finance; Aspects of budgeting like setting personal goals, estimating likely expenses and managing saving, investment and spending

UNIT 11: ENTREPRENEURIAL SKILLS, ETHICS AND INTEGRITY

Basics of entrepreneurship- meaning of Entrepreneurship, classification and types of entrepreneurs, traits and competencies of entrepreneur; creating business plan - problem identification and idea generation, idea validation, pitch making; ethics and conduct - importance of ethics, personal and professional moral codes of conduct, creating a harmonious life

UNIT 12: LOVE AND COMPASSION, TRUTH, NON-VIOLENCE

Forms of love; love, compassion, empathy, sympathy and non-violence, narratives and anecdotes from history and literature including local folklore on gains and losses in practising love; Truth- truth as value, truth as fact- narratives and anecdotes from history and literature including local folklore on gains and losses in practicing truth; Non-violence – Ahimsa, individuals and organizations that are known for their commitment to non-violence; Narratives

and anecdotes about non-violence from history and literature, including local folklore on gains and losses in practicing non-violence

UNIT 13: PEACE, SERVICE, RENUNCIATION

Peace- its need, relation with harmony, and balance; Narratives and anecdotes about peace from history and literature, including local folklore on gains and losses in practicing peace; Service and its forms; Narratives and anecdotes dealing with instances of service from history and literature, including local folklore on gains and losses in practicing service; Renunciation and sacrifice; self-restrain and ways of overcoming greed; narratives and anecdotes from history and literature, including local folklore on gains and losses in practicing renunciation and sacrifice

UNIT 14: CONSTITUTIONAL VALUES, JUSTICE AND HUMAN RIGHTS, RIGHTEOUSNESS

Righteousness, dharma and propriety; Fundamental Values like Justice, Liberty, Equality, Fraternity, Human Dignity; Fundamental Rights and Fundamental Duties as stated in Indian Constitution

Reading List

- Sen, Madhuchanda. 2010. An Introduction to Critical Thinking. Delhi: Pearson.
- Silvia, P. J. 2007. How to Read a Lot. Washington DC: American Psychological Association
- EH McCrath, 1999; Basic Managerial Skills for All; Prentice Hall of India
- Ashokan, M. S. 2015. Karmayogi: A Biography of E. Sreedharan. London, UK: Penguin
- Chandra, P. 2017. Financial Management: Theory & Practice. 9th edition. New York: McGraw Hill Education
- Leading with Cultural Intelligence: The New Secret to Success, New York: American Management Association
- McCormack, M.H. 1986. What They Don't Teach You at Harvard Business School: Notes from A Street-Smart Executive. New York: Bantham
- Sinek, S. 2009. Start With Why: How Great Leaders Inspire Everyone to Take Action. London: Penguin
- Basham, A.L. 1954. First edition. The Wonder That Was India. London: Picador Press.
- Ghosh, Shantikumar. 2004. Universal Values. Kolkata: The Ramakrishna Mission.
- Ghosh, Sri Aurobindo. 1998. The Foundations of Indian Culture. Pondicherry: Sri Aurobindo Ashram.
- Joshi, Kireet. 1997 Education for Character Development, Delhi: Dharma Hinduja Centre of India Studies

AEC 401

Studies of Assamese Culture

Course Objectives

The course aims at enabling a learner to:

- Discover the underlying spirit of Assamese culture and milieu
- Explain the different aspect of Assamese culture

Course Outcomes

After going through this course, a learner will be able to:

- Identify the rich cultural heritage of Assam.
- Formulate the difference between heritage and contemporary trends.

Syllabus

অধ্যায় ১: ঐতিহাসিক প্রেক্ষাপটত অসম

প্রাগ্জ্যোতিষপুর, কামৰূপ, অসম নামৰ উৎপত্তি, অসমৰ ভৌগোলিক অৱস্থিতি, জাতি - জাতিৰ ধাৰণা, অসমীয়া জাতি, অসমীয়া জাতি গঠন প্ৰক্ৰিয়া

অধ্যায় ২: সংস্কৃতি - চমু পৰিচয়

সংস্কৃতি - সাধাৰণ পৰিচয়, সংস্কৃতিৰ সংজ্ঞা, সংস্কৃতিৰ স্বৰূপ, .সংস্কৃতিৰ উপাদান, সংস্কৃতিৰ বৈশিষ্ট্য, সংস্কৃতিৰ বিভিন্ন ভাগ :অভিজাত সংস্কৃতি বা মাৰ্গীয় সংস্কৃতি, লোক সংস্কৃতি বা জনকৃষ্টি, জনজাতীয় সংস্কৃতি

অধ্যায় ৩: অসমৰ সংস্কৃতি - বৈচিত্ৰ্যৰ মাজত ঐক্য

অসমৰ সংস্কৃতি - সমন্বয় আৰু সমাহৰণৰ বিভিন্ন বিষয়: ভাষা, সাহিত্য, ধৰ্ম, উৎসৱ-অনুষ্ঠান, সামাজিক লোকাচাৰ, নৃত্য-গীত, খাদ্য, সাজ-পাৰ

অধ্যায় ৪: অসমীয়া সংস্কৃতিত বিভিন্ন জাতীয়-জনগোষ্ঠীয় উপাদান আৰু অৱদান

অসমীয়া সংস্কৃতিত বিভিন্ন জনজাতীয় উপাদান, টাই (আহোম) উপাদান, মুছলমানসকলৰ অৱদান

অধ্যায় ৫: অসমৰ ধৰ্মীয় পৰম্পৰা

শৈৱধৰ্ম: অসমৰ শৈৱধৰ্ম, অসমৰ শৈৱ মঠ-মন্দিৰ, অসমৰ শৈৱ সাহিত্য; শাক্তধৰ্ম: অসমৰ শাক্তধৰ্ম, অসমৰ শক্তিপীঠ আৰু মঠ-মন্দিৰ, অসমৰ শাক্ত সাহিত্য;

বৈষ্ণৱধৰ্ম : অসমৰ বৈষ্ণৱ আৰু নৱ-বৈষ্ণৱ ধৰ্ম, অসমৰ বৈষ্ণৱ সাহিত্যৰ চমু আভাস

অধ্যায় ৬: সত্ৰীয়া সংস্কৃতি

সত্ৰীয়া সংস্কৃতি: সত্ৰৰ সংজ্ঞা, উৎপত্তি, সত্ৰৰ বিভিন্ন বিভাগ আৰু বিস্তৃতি, সত্ৰৰ বিষয়বসীয়া তথা প্ৰশাসন, সত্ৰৰ নিত্যকৰ্ম - সত্ৰীয়া নাম-প্ৰসংগ, সত্ৰৰ নৈমিত্তিক কাৰ্য তথা সত্ৰৰ উৎসৱ-অনুষ্ঠান, সত্ৰৰ কেতবোৰ পালনীয় আচাৰ-ৰীতি, সত্ৰীয়া গীত, নৃত্য, বাদ্য আৰু ভাওনা

অধ্যায় ৭: নামঘৰ – চমু পৰিচয়

নামঘৰ : চমু পৰিচয়, নামঘৰৰ কাৰ্যপ্ৰণালী – ধৰ্মীয়-চৰ্চা তথা শিল্প-চৰ্চাৰ কেন্দ্ৰ, নামঘৰৰ সামাজিক কৰ্তৃত্ব

অধ্যায় ৮: সত্ৰীয়া পৰিৱেশ্যকলা

সত্ৰীয়া পৰিৱেশ্য কলা; সত্ৰীয়া সংগীত: বৰগীত, কীৰ্তন, নামঘোষা আৰু আনুষংগিক ধাৰা; সত্ৰীয়া নৃত্য আৰু বাদ্য; অংকীয়া নাট আৰু ভাওনা

অধ্যায় ৯: লোক সংস্কৃতিৰ চমু আভাস

লোক সংস্কৃতি - সাধাৰণ পৰিচয়; অসমৰ লোক সংস্কৃতি: বাচিক সংস্কৃতি, ভৌতিক সংস্কৃতি, সামাজিক লোক প্ৰথা বা লোকাচাৰ, লোক পৰিৱেশ্য কলা

অধ্যায় ১০: মৌখিক সাহিত্য

মৌখিক সাহিত্য; অসমীয়া মৌখিক সাহিত্য

অধ্যায় ১১: সামাজিক লোকাচাৰ

সামাজিক লোকাচাৰ: লোক বিশ্বাস আৰু লোক ধৰ্ম, লোক উৎসৱ-অনুষ্ঠান, অৱসৰ-বিনোদন আৰু খেল-ধেমালি, লোক ঔষধ আৰু লোক চিকিৎসা

অধ্যায় ১২: ভৌতিক সংস্কৃতি

ভৌতিক সংস্কৃতি: লোক শিল্প, লোক কলা, লোক স্থপতিবিদ্যা, লোক আভৰণ, লোক বন্ধনপ্ৰণালী

অধ্যায় ১৩: লোক পৰিৱেশ্য কলা

লোক পৰিৱেশ্য কলা; অসমৰ লোক পৰিৱেশ্য কলা: লোক সংগীত, লোক নাট্য

অধ্যায় ১৪: অসমৰ কেইটিমান নিৰ্বাচিত লোক পৰিৱেশ্য কলা

অসমৰ কেইটিমান নিৰ্বাচিত লোক পৰিৱেশ্য কলা: ওজাপালি, কুশানগান, ঢুলীয়াভাওনা, খুলীয়াভাওনা

Reading List

- Asom Sahitya Sabha (1962), Asomor Janajati. Jorhat.
Baruah, Birinchi Kumar (1985). Asomor Loka Sanskriti. Guwahati: Bina Library
Bhattacharjya, Pramod Chandra (1999). Asomor Janajati. Guwahati Lawyer's Book Stall.
Gogoi, Lila (1994). Asomor Sanskriti. Dibrugarh: Banalata.
Goswami, Narayan Chandra (2005). Satra Sanskritr Swarnarekha. Guwahati: Lawyer's Book Stall.
Hakacham, Upen Rabha (2000). Asomor Janajatiya Sanskriti. Guwahati: Bani Mandir.
Narjee, Bhaben (1966). Bodo-Kacharir Samaj aaru Sanskriti, Guwahati: Lawyer's Book Stall.
Neog, Hariprasad and Gogoi, Lila (Compl. And Ed.) (1989). Asomia Sanskriti.: Dibrugarh: Banalata.
Padun, Nahendra (1993). Asomia Sanskritiloi Janajtiya Borongani. Guwahati: Lawyer's Book Stall.

AEC 402

Spoken English

Learning Objectives

The objectives of the course are to:

- acquaint the learners with the basic elements that make up English speech
- provide a general study on some of the key areas of English functional grammar
- enable the learner to develop a proper idea on the use of various grammatical forms
- develop in learners the necessary skills and techniques of oral communication, day-to-day conversations, interview etc. in English
- encourage the development of public speaking skills and speech skills on special occasions
- highlight the importance of Spoken English

Learning Outcomes

- After going through the course, the learner will be able to:
- discuss the importance of English in the 21st century global context
- develop a proper idea on the use of various grammatical forms
- develop the necessary skills and techniques of oral communication, day-to-day conversations, interview etc. in English
- appreciate the importance of Spoken English in the present context

Syllabus

UNIT 1: IMPORTANCE OF SPOKEN ENGLISH

Knowing the importance of English in the Global Context, Skills of Better Communication

UNIT 2: ISSUES ON ORAL COMMUNICATION I

Skills Involved in Oral Communication, Listening and Speaking Skills, Reading and Writing Skills, The Process of Speech, Non-verbal Communication

UNIT 3: ISSUES ON ORAL COMMUNICATION II

Conversation as a speech event, Turn-Taking, The Language of Conversation, Phrasal Verbs

UNIT 4: GRAMMAR IN CONTEXT I

Grammaticality and Appropriateness, Eliciting Information, Question Patterns in Context, Some Verb Forms in Context

UNIT 5: GRAMMAR IN CONTEXT II

Modals in Conversation, Uses of Will and Would, Uses of May, Might and Must, Uses of Other Modals, Uses of Shall, Should and Shouldn't, Miscellaneous Uses of Modals

UNIT 6: INFORMAL AND FORMAL SPEECH

Features of Informal speech, Ellipsis, Discourse Markers in Informal Speech, Discourse Markers of Formal Speech

UNIT 7: SOUNDS OF ENGLISH I

Units of Speech Sounds, The Vowel Sounds, The Consonant Sounds, Minimal Pairs, Vowel Contrasts, Consonant Contrasts

UNIT 8: SOUNDS OF ENGLISH II

Word Stress, Placement of Word Stress, Stress in Compound Words, Grammatical Function of Stress, Sentence Stress and Intonation

UNIT 9: COMMUNICATION SKILLS

What is Communication? Types of Communication, Written Communication, Spoken Communication, Non-Verbal Communication, Essentials of Written Communication, Essentials of Oral Communication

UNIT 10: TELEPHONE SKILLS

Understanding Telephone Communication, Handling Calls, Making Requests, Request to Do Things, Giving Instructions

UNIT 11: INTERVIEW SKILLS

The Art of Interviewing, Examples of Interviews—Job Interviews, Media Interviews

UNIT 12: PUBLIC SPEAKING

The art of Public Speaking, Techniques of Persuasive Speech, Techniques of Informative Speech

UNIT 13: SPEECHES FOR SPECIAL OCCASIONS

Public Speaking on Special Occasions—Address of Welcome, Introducing the Speaker, Vote of Thanks, Group Discussion

UNIT 14: DIALOGUES IN CONTEXTS

Importance of Dialogues in Social Interactions, Some Dialogues of Contexts—At the Post Office, At the Doctor's, Buying a Shirt, At the Market, In the Library, At the Railway Station, At the Tea Stall, An Interview, At the Book Seller's, At the Garage, Hiring a Taxi, At the Restaurant, At the Bank, At the Hotel

Reading List

- Carmen, Robert. (ed.) Spoken English: Flourish Your Language. Abhishek Publication: Chandigarh.
- Eastwood, J. (1994). Oxford Guide to English Grammar. Oxford University Press.
- Karal, Rajeevan et al. (2016). English for Successful Communication. Oxford University Press.
- Koneru, Aruna. (2013). Professional Speaking Skills. Oxford University Press
- Sasikumar, V. and Dhamija, P.V. (1993). Spoken English: A Self- Learning Guide to Conversation Practice. Tata McGraw-Hill Publishing Company Limited.
- Seely J. (2004). Oxford Guide to Effective Writing and Speaking. Oxford University Press.
- Sethi, J. et al. (2004). A Practical Course in English Pronunciation. Prentice Hall of India.
- Sethi, J and P.D. Dhamija. (1999). A Course in Phonetics and Spoken English. Prentice Hall.

AEC 403

English for Media Studies

Course Objectives

- To familiarise the learners with the process of writing for the media
- To identify the specific use of English in the field of media
- To equip learners with basic writing skills required for media

Course Outcomes

- On completion of this course, the learners will be able to-
- Familiarize oneself with the process of writing for different forms of media
- Make proper utilization of the English language in media
- Acquire the basic writing skills in English for various media forms

Syllabus

Unit 1: INTERVIEWING AND NOTE TAKING

Definition of Interview, preparing for interview, conducting the interview, text of interview, language for audio-visual interview, note taking

Unit 2: EDITORIAL WRITING

Defining Editorial, Introduction to the editorial page, writing the editorial, rules for Editorial writing, writing the Feature, writing the Article, writing the middle, Letters to the Editor

Unit 3: ART OF COLUMN WRITING

Types of columns, distinguishing characteristics of an op-ed, steps to be followed while writing a column

Unit 4: ELEMENTS OF GOOD WRITING

Characteristics- precision, clarity in writing, use of simple sentences, grammar and punctuation, avoiding clichés, pacing, use of transitions

Unit 5: PREPARING COPY

Copy editing- use of quotes, paraphrases, attribution, writing the lead, grammatical mistakes- confusion in the use of 'who' and 'whom', possessive pronouns, use of active voice, copy reading symbols

Unit 6: MASTERING THE LANGUAGE OF EDITING

Importance on vocabulary, sentence construction, participles, pronouns, verbs, nouns, foreign words, prepositions, paragraphs, selection of right words

Unit 7: REVIEW WRITING

Book review- fiction, adverse criticism, non-fiction, the collection, poetry, drama, Steps to be followed while doing a book review, drama review, Film review

Unit 8: NEWS WRITING

Language and style of Indian Media, Language and style for print and cyber media, Language and style for Radio, Language and style for Television

Unit 9: HEADLINE WRITING

Meaning of headline, Types of headline, Functions of a headline, Factors to be kept in mind while writing headlines, Headline writing skills- use of verbs, use of Articles and Voices, Use of Decks, The Five Ws, use of short synonyms, Abbreviations, Punctuation, Line Balance, Guidelines for headline writing

Unit 10: WRITING FOR ADVERTISING COPY

Introduction, Key concepts in advertising, Copywriting, Radio copy, Television copy

Unit 11: WRITING AND REWRITING FOR PUBLIC RELATIONS

Preparing news releases- Announcement releases, Backgrounders, Position Papers, Tip Sheets, Rewriting news releases, Writing newsletter stories

Unit 12: GRAMMAR AND USAGE

Sequence of tenses, Voice, Narration, Punctuation, Vocabulary

Unit 13: COMMON ERRORS IN THE USE OF ENGLISH LANGUAGE

Errors of concord, Errors of construction, Errors of order, Errors in prepositions, Errors in conjunctions

UNIT 14: REPORTING PUBLIC SPEECH

Reporting public speeches- background information, covering the speech, using a prepared text, writing the speech story for print

Unit 15: STYLE AND THE STYLEBOOK

Need of a stylebook, -consistency, preference and tradition, Guidelines of different stylebooks, Mechanical rules

Reading List

- Chaturvedi, S.N. (2007), Dynamics of Journalism and Art of Editing, Cyber Tech Publications, New Delhi
- Hough, George A. (2006), News Writing, Kanishka Publishers, Distributors, New Delhi
- Kamath, M.V (2005), The Journalist's Handbook, Vikas Publishing House Pvt Ltd, New Delhi
- Lorenz, Alfred Lawrence, John Vivian (2006), News : Reporting and Writing, Dorling Kindersley, New Delhi
- Parthasarathy, Rangaswami (2006), Basic Journalism, Macmillan India Ltd., New Delhi
- Singh, Chandrakant P. (1999), Before the Headlines, Macmillan India Limited, New Delhi
- Sissons, Helen (2006), Practical Journalism : How to Write News, Sage Publications, UK
- Singh, Bhanu Pratap (2011), Art of Editing, Anmol Publications Pvt Ltd, New Delhi
- Wynn, Mary J.J. (2008), Elements of Journalism, Cosmo Publications, New Delhi

Detailed Syllabi of Skill Enhancement Courses (SECs)

SEC 101

Office Management

Course Objectives

The objectives of the Course are to help the learner's in

- Understanding the concepts of office management and office administration
- Understanding of Office Automation, space management, workplace environment
- Acquiring the knowledge of official terms used in workplace
- Understanding the key concepts of office communication
- Understanding the significance of mailing section, Arrangements with post offices, inward Mail routine and Dealing with correspondence
- Informing with various types of stationeries, drafts, noting, equipment and knowledge in the use of appliances

Course Outcomes

Upon successful completion of the course, the learners will be able to:

- Familiar with office management and office administration
- Acquire skills needed by an administrative assistant to function in such office environment.
- Use human relations skills, interpersonal interactions, as well as verbal and written communications.
- Develop skills in arrangement of papers for filing, methods of filing and indexing

Syllabus

UNIT 1: INTRODUCTION TO OFFICE MANAGEMENT

Meaning and importance of office, Nature and functions of Office, Relationship of office with other departments, Functions-basic and auxiliary, Position and role of an office manager

UNIT 2: OFFICE ADMINISTRATION

Administrative office management, objectives of administrative office management, functions of administrative office manager, scientific office management

UNIT 3: OFFICE LAYOUT

Office Layout and Working Condition, Location of office, Office building, Office layout-nature, principles, types, Open and private offices,

UNIT 4: OFFICE ENVIRONMENT

Lighting, ventilation, safety from physical hazards, sanitary requirements, cleanliness, security and Temperature and interior decoration

UNIT 5: OFFICE SERVICES

Centralization versus decentralization of office services, departmentation of office, departments of a modern office

UNIT 6: WORKFLOW IN OFFICE

Workflow in Office, Concept of work-flow and flow charts, Difficulties in work flow.

UNIT 7: OFFICE ORGANIZATION

Office Organization Principles, Types - line, line and staff and services Organization, Office charts and manuals.

UNIT 8: OFFICE COMMUNICATION

Basic Principles, Internal Communication and External communication, Handling Inward and Outward communication; Mail Organization of the mailing section, Arrangements with post offices, Inward Mail routine, Dealing with correspondence, Outward mail routine, Mechanizing mail service.

UNIT 9: FILING AND INDEXING

Concept and Meaning of Filing, Objectives and Importance of Filing, Classification and Arrangement of Papers for Filing, Methods of Filing, Centralized and Decentralized Filing System, Indexing

UNIT 10: OFFICE STATIONARY

Concept and meaning of office stationery, Types of office stationery, Control of office stationary and supplies, Standardization of Office supplies, Purchasing Office Stationeries and Supplies, storage and Office Manager and Stationary control

UNIT 11: OFFICE AUTOMATION

Uses and abuses of Labour saving appliances and various types of commonly used appliances

Reading List

- Balachandran, V. and Chandrasekaran, V. (2009), Office Management, Tata McGraw Hill Education Private Limited
- Balachandran (2009); Office Management; Tata McGraw-Hill Education, India
- Bhatia, Dr. R. C. (2005); Principles of Office Management; Lotus Press; India
- Bhatnagar, S. K. (2011); Office Management; Frank Brothers; India
- Chakravarti, B. K. (2006); Concept of Front Office Management, APH Publishing; India
- Chopra, R. K. and Chopra, Ankita (2009), Office Management, Published by Himalaya Publishing House
- Dix, Colin and Baird, Chris (2006); Front Office Operations, Pearson Education India
- Dubey, N. B. (2009); Office Management: Developing Skills for Smooth Functioning, Global India Publications; India.
- S.S. Khanka (2007), 'Human Resource Management: Text and Cases', 1st Edition, S. Chand and Company Ltd, New Delhi

SEC 102

Organic Farming

Course Objectives

The main objectives of the course are to:

- create awareness about organic production system
- familiarize with organic crop management practices, organic standards and certification
- promote self-employment and income generation

Course outcomes

- Develop critical understanding of various aspect of organic production
- Apply their knowledge and skills by establishing their own organic farm
- Comprehend the importance of eco-friendly fertilizers and pesticides

Syllabus

UNIT 1: PRINCIPLES OF ORGANIC FARMING

The Science of Modern Farming, Development of Organic Farming: Definitions of Organic Farming Concept of Organic Farming: Organic Concept, Holistic Concept, Living Soil Concept, Healthy Plant Concept; Principles of Organic Farming: The Principle of Health, The Principle of Ecology, The Principle of Fairness, The Principle of Care; Role of International Organisations

UNIT 2: ORGANIC NORMS

Certification and Inspection in Organic Farming, National Norms: Certified organic farmer, Basic requirements in an organic farm, Certification, group certification, Organic Certification agencies in North East India, International norms: International Organic Standards: The IFOA and Its Norms: IFOAM Basic Standards (IBS) and IFOAM Accreditation Criteria, The European Union (EU) Council's Regulation on Organic Production; Japanese Organic Standards; United States of America Organic Standards; Comparison of EU, JAS and USDA Organic Standards; Private Certification in Some Countries

UNIT 3: FARM SOIL MANAGEMENT

Farm Design, Components of an Organic Farm, Planning and Layout of the Farm; Farm Components in Different Agro Eco-Systems; Field Crops in Organic Farms, Trees in Organic Farms: Border Trees, Agro forestry, Farm Forestry, Benefits of Trees in organic Farm; Farm Biodiversity, Field Bunds; Farm Structures: Cattle Shed, Storehouse, Farm Office; Land Preparation: Implements Used for Land Preparation, Factors Influencing Land Preparation, Summer Ploughing, Wetland Preparation; Types of Tillage: Conventional Tillage, Minimum Tillage, Zero Tillage, Conservation Tillage; Organic mulching, green cropping, cover cropping, biochar and its application, Buffer Zone

UNIT 4: SEEDS, PLANTING AND FARM IMPLEMENTS

Seeds: Structure and germination, Seed dormancy: causes and method of breaking dormancy, Seeds sowing/ Planting of some important crops, Different Farm implements: Ploughing, sowing, inter-cultivation and other

UNIT 5: WATER MANAGEMENT AND CONTAMINATION CONTROL

Quality and standard of irrigation water, Schedule of irrigation, Preparation of land for irrigation, Methods of irrigation, Critical Stages in Crop Development: Cereals and Millets, Legumes and Oil Seed, Vegetables and Fruit Crop, Contamination: Soil, water and air, Control of

contamination: National Guidelines, Protecting Farm Ponds and Wells, Decontaminating Farm Wells, Contamination Control for Pesticide Spill, Human Relation

UNIT 6: CROP ROTATION AND CROPPING SYSTEM

Principles of Crop Rotation, Effect of crop rotation; Selection of crops for rotation Advantages and disadvantages of Crop Rotation, relay cropping

UNIT 7: COMPOSTING AND MANURING

Organic Resources Available for Manuring and Composting; Compost and Composting; Stages of Composting: Mesophilic Stage, Thermophilic Stage, Curing; Principles of Composting Types of Composting: Aerobic Decomposition, Anaerobic Decomposition, Methods of Composting, Vermicomposting; Factors Affecting Composting: C/N Ratio of the Bedding Materials, Blending and Shredding, Moisture, Temperature, Oxygen or Aeration, pH

UNIT 8: BIO FERTILIZERS, BIO PESTICIDES AND BIOCONTROL AGENTS

Types of bio fertilizers, biopesticides; Methods of Bio fertilizer application: Seed, root and Soil; Biocontrol agents: Uses and application

UNIT 9: MARKETING OF ORGANIC PRODUCE

Markets - Concepts and Classification: Definition of Market, Classification of Markets, Channel of Distribution and Role of Middlemen, Understanding the Marketing Process, Marketing of Agricultural Products ; Marketing of Organic Produce: Current Status of World Organic Market, Organic Market in India Limitation of Organic Market in India

UNIT 10: GOVERNMENT SCHEMES AND OTHER FINANCIAL RESOURCES

National Programme for Organic Production; Schemes of Ministry of Agriculture (MoA) Govt. of India; Scheme on Organic Farming under National Horticulture Mission; Supports for Organic Farming under Technology Mission for Integrated Development of Horticulture in the North Eastern States; Scheme on Capacity Building for Organic Products; Other Financial Resources

Practical

Unit 1: Visit to organic farm and bio fertilizer production unit

Unit 2: Seed Treatment of important crops

Unit 3: Sowing and Planting of important crops

Unit 4: Preparation and application of Compost

Unit 5: Preparation of Plant protection inputs like organic pesticides, neem cake.

Unit 6: Preparation of vermicompost and Vermiwash

SEC 103

Introduction to Geo-informatics [Credits: 2 Theory+1 Practical]

Course Objectives

- To provide the basic concepts and significance of Geoinformatics
- To give an idea to understand maps used in Geographic Information System (GIS)
- To familiarize with the GIS and its applications
- To get an idea of various GIS data types
- To describe the applications of geoinformatics in different areas

Course Outcomes

At the end of the course, a learner will be able to

- Understand the relationship between people, climate, landforms, river system, vegetation and much more
- Develop the computer and management skills as a part of geospatial technology using GIS tools

UNIT 1: UNDERSTANDING MAPS

Definition of a map; Properties of maps; Types of maps; Present day significance of maps; Map Projection Systems; Map Projections for Hemispheres and the World; Map Projections for Continents and Regions; Concept of Datum; Universal Transverse Mercator projection; International Terrestrial Reference Frame in GIS

UNIT 2: INTRODUCTION TO GIS

Basic Concepts of Geographic Information System; Components of a GIS; Spatial Data Creation; Data Types: Spatial Data, Non-Spatial Data, Raster Data, Vector Data, TIN; Data Editing and Analysis; Topological Relationships; Advantages of GIS; Social and Institutional Context of GIS; Contemporary Development of GIS; Web GIS

UNIT 3: INTRODUCTION TO GNSS

Introduction to GPS; GPS Applications: Asset Mapping, Navigation Services, Location Based Services; Introduction and Surveying

UNIT 4: BASICS OF REMOTE SENSING

Introduction to Remote Sensing; Types of Remote Sensing; Indian Remote Sensing Programmes

UNIT 5: OPEN DATA SOURCES AND SOFTWARE FOR GEOINFORMATICS

Open-Source Data: Bhuvan, USGS, Google Earth, Gram Manchitra; Open source Digital Elevation Model; Open Source Software: QGIS.

UNIT 6: APPLICATIONS OF GEOINFORMATICS

Application of Geoinformatics in Natural Resource Management, Watershed Management, Disaster Management, Rural Development, Urban Planning, Monitoring and Evaluation of Projects.

Reading List

- George Joseph, (2005), Fundamentals of Remote Sensing (2nd ed.), University Press, pp.1-474
DeMers M. N., 2000: Fundamentals of Geographic Information Systems, John Wiley & Sons

Lillesand, T.M., Kiefer, W.R. and Chipman, W.J, (2004), Remote Sensing and Image Interpretation, (5th ed.), Wiley India Publication, pp.1-763
Clarke K. C., 2001: Getting Started with Geographic Information Systems, Prentice Hall
French, G. T. 1996: Understanding the GPS: An Introduction to the Global Positioning System, Geo Research Inc.
Burrough. P.A. & McDonnell. R. (1998), Principles of Geographic Information Systems, OUP

SEC 201

Tea Cultivation and Management

Course Objectives

- impart both theoretical and practical knowledge in the functional areas of tea plantation and management
- encourage the small tea cultivation among the unemployed youth
- help those who have already engaged themselves in Tea Plantation sector

Course outcomes

After completing the course a learner will be able to

- apply their knowledge and skills by establishing their own tea plantation
- get employability in various sectors like tea gardens, Tea Processing Units, Tea brokering houses, Tea Research Institute
- Integrate knowledge of tea cultivation and management in a scientific way

Syllabus

UNIT 1: INTRODUCTION TO TEA AND ITS CULTIVATION

Beginning of tea cultivation in India, the tea plant and its cultivation, tea growing areas in India, small scale tea cultivation in Assam, tea cultivation in non traditional areas and other N.E. states, tea industry and its role in national economy, developmental agencies

UNIT 2: SOIL AND CLIMATIC REQUIREMENTS

Soil requirements-physical, chemical and biological properties, land features slope, altitude and aspects, climatic requirements- rainfall, temperature, R.H., day length and wind velocity, selection of sites for tea, soil and water conservation.

UNIT 3: PLANTING MATERIALS OF TEA AND PROPAGATION

Planting materials-clone, clonal seed, differences between clone and clonal seeds, choice of planting materials, production of planting materials-clonal nucleus plot, tea seed barie; Seed propagation, vegetative propagation, tea nursery, nursery techniques for V.P. nursery techniques for seed propagation, nursery management

UNIT 4: LAND PREPARATION AND PLANTING

Land preparation-land preparation in virgin, uprooted and marginal lands; Planting-age and size of plant, stacking, spacing, pit digging, planting time, after care, infilling, planting in undulating hilly areas-catchment planning

UNIT 5: YOUNG TEA MANAGEMENT

Objectives of training, frame formation-operations, methods of bringing up for plain areas of N.E. India and hilly areas, cultural practices adopted in young tea management

UNIT6: PRUNING OF TEA

Pruning - Objectives of pruning, skiffing, different types of pruning and skiffing, method of pruning, pruning cycle

UNIT7: PLUCKING OF TEA

Objectives of Plucking, plucking-tipping, maintenance foliage, plucking systems, standard of plucking, plucking round, creep, breaking back, banjhi shoot, plucking baskets/ bag care and handling of green leaf

UNIT 8: PLANT PROTECTION

Weeds in Tea plantation, weeds control methods-manual or mechanical, chemical control, Weed Control in Nursery, young tea areas and immature tea ; Tea pests- leaf and shoot pests, stem and branch pests, other pests. Sprayers, and application of pesticides, - sprayers, target sites for application, integrated pest management; tea diseases-casual agencies and classification, common tea diseases, description of common tea diseases and their management, seedling diseases, primary and secondary diseases

UNIT9: PHYSIOLOGICAL DISORDERS AND COLD WEATHER OPERATIONS

Adverse climatic and soil conditions, external agencies, cold weather management

UNIT10: COST DEVELOPMENT OF TEA PLANTATION AND RECORD KEEPING IN TEA GARDEN

Cost development of Tea Plantation – requirement of labour, cost of labour and inputs, income, Record keeping-definition, good record keeping systems, branches of record keeping, books and accounts, information to be maintained in tea garden

Practical

Unit 1: Land Preparation for Planting of Tea

Unit 2: Planting of Tea

Unit 3: Methods of Frame Formation in Tea

Unit 4: Fertilizer Application in Young and Mature Tea.

Unit 5: Pruning and Skiffing of Mature tea

Unit 6: Tipping and Plucking of Tea

Reading list

C.R., Harler. (2022) "teaproduction". Encyclopedia Britannica.

<https://www.britannica.com/plant/tea-plant>. Accessed 20 July 2022.

Panda,H. (2016). The Complete book on Cultivation and Manufacture of Tea. Asia Pacific Business Press Inc

Barua, D.N. (2008). Science and Practice in Tea Culture. Tea Research Association, Kolkata.

Ghosh Haira,N. (2001). Tea Cultivation-Comprehensive Treatise, International Book Distributing Co., Lucknow

Willinson, K.C. and Clifford, M.N. (1992). ‘Tea’ Cultivation to Consumption, Springer Dordrecht

The Tea Plant. http://teaworld.kkhsou.in/lessons_details.php?lesson=The-Tea-Plant&urltitlepage=4c59b38ba721a5ad8713

Climate and Soil for Tea

Cultivation.http://teaworld.kkhsou.in/lessons_details.php?lesson=Climate-and-Soil-for-Tea-Cultivation&urltitlepage=387bc6c0428d2cd31be8

Propagation of Tea and Nursery Management

http://teaworld.kkhsou.in/lessons_details.php?lesson=Propagation-of-Tea-and-

SEC 202

Electricity and Electrical Wiring [2 Theory+1 Practical]

Course Objectives

- To provide the basic concepts of various forms of energy and their sources
- To familiarize with the basic principle of electrical current flow, different terms, their relations and different laws, measurement of current, voltage, power and energy
- To give an idea about magnet, magnetic materials, properties and electromagnetic induction
- To learn wires, cable, house wiring, materials required for house wiring and earthing
- To familiarize with diode, transistor, devices using diode and transistor
- To learn about electrical safety precaution and shock treatment
- To understand the Indian Electricity Rule

Course Outcomes

- After the completion of this course, the learner will be able to-
- describe the fundamental concept of electricity
- define various terms and applications of laws of electric circuits
- select appropriate tools and measuring instruments to carry out electrical works
- identify house wiring components according to their size and specification
- explain the earthing, necessity of earthing and how earthing is done
- perform the tests on newly installed house wiring
- explain about the functioning of semiconductor and devices using semiconductor
- follow the safety precautions, electrical shock treatment and Indian Electricity Rule

Syllabus

UNIT 1: FUNDAMENTALS OF ELECTRICITY

Forms of Energy: Types, their units, advantages of Electrical Energy; Sources of Electricity: conventional and non-conventional; Atomic structure; Static and dynamic electricity; Basic terms used in electricity and their definitions: electric potential, potential difference, electrical power, energy and problems; Ohm's Law; Resistance and Specific Resistance: Definition, Effect of temperature on resistance; Conductor and Insulator: Types, properties and applications.

UNIT 2: FUNDAMENTALS OF ELECTRICAL CIRCUIT

Familiarization of common components: Interconnection of passive components; Resistance in series and parallel; Advantages and disadvantages of series and parallel circuit; Voltage and current divider rule; Kirchhoff's Laws.

UNIT 3: INTRODUCTION TO MAGNETISM

Magnet and types of magnet; Permeability and type of magnetic materials on the basis of permeability; Magnetic property of materials; Magnetic effect of electric current; Electromagnetic induction and Faraday's Laws of Electromagnetic Induction; Familiarization with some common devices

UNIT 4: FUNDAMENTALS OF ALTERNATING CURRENT

Direct current (DC) and alternating current (AC): comparison between AC and DC; Electro Motive Force equation: Cycle frequency, time period, amplitude, phase, rms value, average value; Ac Circuit: Inductance, Inductive reactance, capacitance, capacitive reactance, impedance; Power factor and power

UNIT 5: ELECTRICAL MEASUREMENT INSTRUMENT

Multimeter: Analog Multi-meter, Digital Multi-meter; Tong Tester; Measuring Instrument: Permanent Magnet Moving Coil, Moving Iron, Induction type instrument; Measurement Meters: Watt-meter, Energy-meter, Power factor meter; Voltmeter and Ammeter: Extension of range of voltmeter, loading effect of voltmeter, calibration of voltmeter, Extension of range of ammeter, voltage drop effect of ammeter, calibration of ammeter; Current Transformer and Potential Transformer; Earth resistance meter.

UNIT 6: WIRES AND ACCESSORIES

Types of wires and cables: Characteristics, Current carrying capacity; Types of joints and termination; Safety consideration and regulations

UNIT 7: ELECTRICAL HOUSE WIRING

Method of house wiring; Types of surface wiring and concealed wiring; Wiring accessories and their specifications; Wiring diagram; Types of connections of lamps including staircase connection; Testing of house wiring.

UNIT 8: EARTHING

Importance of earthing; Ground connection and size of GI wire for ground connection; Various types of earthing; Measurement of earth resistance

UNIT 9: SAFETY REQUIREMENT

Hazards of electricity: Fire hazard and electric shock; Safety precautions and electrical safety sign; Shock treatment; Firefighting equipment for fire involving electrical equipment; Indian Electricity Rules and Indian Electricity Act

UNIT 10: SEMICONDUCTOR DEVICES

Semiconductor: Type of semiconductor, Examples; PN junction diode: formation of PN junction diode, forward bias and reverse bias characteristics, application; zener diode; Transistor: Type of transistor, configuration, Working of transistor, operation mode; Field effect transistor; power transistor; LDR.

UNIT 11: INTRODUCTION TO ELECTRICIAN TRADE

Electrician trade: Scope of electrician trade, Employment opportunity; Responsibilities of electrician and wiremen; Training of electrician.

Reading List

Kothari D. P. and I. J. Nagrath, Basic Electrical Engineering, 3rd edn, McGraw Hill Education (India) Private Limited, New Delhi.

Gupta J. B., Electrical and Electronics Engineering Materials, 3rd edn, S. K. Kataria & Sons, New Delhi.

Meheta V. K., Rohit Meheta, Basic Electrical Engineering, 5th edn, S. Chand & company Ltd, New Delhi.

Meheta V. K., Rohit Meheta, Principle of Electrical Engineering, 2nd edn, S. Chand & company Ltd, New Delhi.

Thereja B. L., A. K. Thereja, A Text Book of Electrical Technology Volume- I, 23rd edn, S. Chand & company Ltd, New Delhi.

Mittle V. N., Basic Electrical Engineering, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Anwani M. L., Basic Practicals in Electrical Engineering, Dhanpat rai &Co, New Delhi
Singh Tarlok., Fundamentals of Electrical Engineering, S. K. Kataria & Sons, New Delhi.
Dr Das Basudev, D. Haloi, Dr Mitali Chakravorty, Yasmin Zaman, Basics of Electrical Engineering, Book Land Publication, Guwahati.

SEC 301

Cyber Security

Course Objectives

- Learn the foundations of Cyber security and threat landscape
- To equip students with the technical knowledge and skills needed to protect and defend against cyber threats
- To develop skills in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets
- To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security
- To expose students to responsible use of online social media networks
- To systematically educate the necessity to understand the impact of cyber crimes and threats with solutions in a global and societal context
- To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society

Course Outcomes

- On completion of this course, the learners will be able to
- Understand the cyber security threat landscape
- Develop a deeper understanding and familiarity with various types of cyber attacks, cyber-crimes, vulnerabilities and remedies thereto
- Analyse and evaluate existing legal framework and laws on cyber security
- Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds
- Analyse and evaluate the importance of personal data its privacy and security.
- Analyse and evaluate the security aspects of social media platforms and ethical aspects associated with use of social media.
- Analyse and evaluate the cyber security risks.
- Based on the Risk assessment, plan suitable security controls , audit and compliance.
- Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.
- Increase awareness about cyber-attack vectors and safety against cyber-frauds.
- Take measures for self-cyber-protection as well as societal cyber-protection.

Syllabus

UNIT 1: INTRODUCTION TO CYBER SPACE

Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology

UNIT 2: INTRODUCTION TO INTERNET AND CYBER SECURITY

Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security

UNIT 3: CYBER CRIME 1

Classification of cyber-crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children

UNIT 4: CYBER CRIME 2

Financial frauds, Social engineering attacks, malware and ransomware attacks, zero day and zero click attacks

UNIT 5: CYBER LAW

Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organisations dealing with Cyber crime and Cyber security in India, Case studies

UNIT 6: INTRODUCTION TO SOCIAL MEDIA

Introduction to Social networks, Types of Social media, Social media platforms

UNIT 7: HANDLING SOCIAL MEDIA

Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social networks.

UNIT 8: SECURITY ISSUES IN SOCIAL MEDIA

Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.

UNIT 9: INTRODUCTION TO E-COMMERCE

Definition of E- Commerce, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices

UNIT 10: INTRODUCTION TO DIGITAL PAYMENTS

Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhaar enabled payments

UNIT 11: SECURITY ASPECTS IN DIGITAL PAYMENTS

Digital payments related common frauds and preventive measures; RBI guidelines on digital payments and customer protection in unauthorised banking transactions; Relevant provisions of Payment Settlement Act, 2007

UNIT 12: DIGITAL DEVICES SECURITY 1

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software.

UNIT 13: DIGITAL DEVICES SECURITY 2

Device security policy, Cyber Security best practices, Significance of host firewall and Anti-virus, Management of host firewall and Antivirus

UNIT 14: WI-FI SECURITY

Introduction to Wi-Fi, Types of Wireless security: Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), Wi-Fi Protected Access 2 (WPA 2), Wi-Fi Protected Access 3 (WPA 3); Threats and risks to Wi-Fi Security, Ways to protect Wi-Fi network, Types of Wi-Fi network security devices, Configuration of basic security policy and permissions

Reading List

Cyber Crime Impact in the New Millennium, by R. C Mishra, Auther Press. Edition 2010.
Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001)
Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
Fundamentals of Network Security by E. Maiwald, McGraw Hill.

SEC 701

Research Methodology

Course Objectives

After going through this course, a learner will be able to:

- Develop the understanding, meaning and significance of research.
- Identify the steps to be followed while doing a research.
- Make use of the methods of research in Humanities.

Course Outcomes

- Summarize the meaning and significance of research
- Formulate the steps to be followed while doing a research
- Take part in the methods of research in Humanities.

Syllabus

অধ্যায় ১: গৱেষণাৰ সাধাৰণ পৰিচয়- ১

গৱেষণাৰ অৰ্থ; মানৱিকী বিদ্যা অধ্যয়নৰ গৱেষণা; গৱেষণাৰ উদ্দেশ্য; গৱেষণাৰ উপাদানসমূহ; গৱেষণা আৰু তত্ত্ব; তত্ত্বৰ গুৰুত্ব; এটা ভাল তত্ত্বৰ চাৰিটা পৰিমাপ

অধ্যায় ২: গৱেষণাৰ সাধাৰণ পৰিচয়- ২

জ্ঞানৰ তিনিটা পৰ্যায়; সাহিত্য-সমাজ-সংস্কৃতিৰ গৱেষণাৰ বৈজ্ঞানিক পদ্ধতি; বস্তুনিষ্ঠতা আৰু বিষয়ভিত্তিকতা; গৱেষণাক কিহৰ বাবে বৈজ্ঞানিক কৰি তোলা হৈছে? গৱেষণাৰ নৈতিকতাৰ পৰিমাপ

অধ্যায় ৩: গৱেষণাৰ প্ৰকাৰভেদ

গৱেষণাৰ প্ৰকাৰভেদ, গুণগত আৰু পৰিমাণগত গৱেষণা; সুবিধা আৰু অসুবিধা, গুণগত আৰু পৰিমাণগত গৱেষণাৰ মাজৰ পাৰ্থক্য, আন আন প্ৰকাৰভেদ

অধ্যায় ৪: গৱেষণাৰ আঁচনিসাৰ আৰু প্ৰাক্-কল্পনা

গৱেষণাৰ আঁচনি, গৱেষণাৰ আঁচনিৰ প্ৰয়োজনীয়তা আৰু গুৰুত্ব, এটা ভাল গৱেষণাৰ আঁচনিৰ বৈশিষ্ট্য; গৱেষণাৰ প্ৰাক্-কল্পনা মানে কি, প্ৰয়োজনীয়তা, বিশেষত্ব

অধ্যায় ৫: প্ৰাপ্ত-সাহিত্যৰ পুনৰীক্ষণ

প্ৰাপ্ত-সাহিত্যৰ পুনৰীক্ষণৰ অৰ্থ, প্ৰয়োজনীয়তা, উদ্দেশ্য আৰু লক্ষ্য, প্ৰাপ্ত সাহিত্যৰ বিশ্লেষণ, শ্ৰেণীবিন্যাস

অধ্যায় ৬: গৱেষণাৰ তথ্য অথবা সমল

প্ৰাথমিক তথ্য; গৌণ তথ্য : অৰ্থ আৰু সংজ্ঞা; প্ৰাথমিক তথ্য সংগ্ৰহৰ পদ্ধতি, প্ৰাথমিক তথ্যৰ সুবিধা আৰু অসুবিধা, গৌণ তথ্যৰ উৎস, গৌণ তথ্যৰ সুবিধা আৰু অসুবিধা, প্ৰাথমিক আৰু গৌণ তথ্যৰ তুলনা

অধ্যায় ৭: নমুনা বাচনি, তথ্য সংগ্ৰহ আৰু বিশ্লেষণ

অৰ্থ; প্ৰয়োজনীয়তা, প্ৰকাৰভেদ; নমুনা বাচনিৰ বিভিন্ন কৌশল; তথ্য সংগ্ৰহৰ বিবিধ পদ্ধতিৰ চমু আভাস, তথ্য সংগ্ৰহৰ বিবিধ সঁজুলি; তথ্য বিশ্লেষণ, বিবিধ পদ্ধতি, তথ্যৰ ডায়েগ্ৰামেটিক উপস্থাপন আৰু গ্ৰাফিক উপস্থাপন

অধ্যায় ৮: সাক্ষাৎকাৰ

অৰ্থ; সংজ্ঞা; উদ্দেশ্য, প্ৰকাৰ: গাঁথনিগত; অগাঁথনিযুক্ত আৰু অৰ্ধগাঁথনিযুক্ত সাক্ষাৎকাৰ; সাক্ষাৎকাৰৰ গাইড; সাক্ষাৎকাৰৰ বাবে চলোৱা প্ৰস্তুতি; প্ৰশ্নাৱলী প্ৰস্তুতকৰণ

অধ্যায় ৯: প্ৰশ্নাৱলী আৰু পৰ্যবেক্ষণ

ভাল প্ৰশ্নাৱলী প্ৰস্তুতকৰণ; ভাল প্ৰশ্নাৱলীৰ বৈশিষ্ট্য; প্ৰশ্নাৱলীৰ প্ৰকাৰ; প্ৰশ্নাৱলীৰ গুণগত মান; প্ৰশ্নাৱলীৰ দোষ; পৰ্যবেক্ষণ: অৰ্থ; সংজ্ঞা আৰু প্ৰকাৰ; অংশগ্ৰহণকাৰীৰ পৰ্যবেক্ষণ: অৰ্থ; সুবিধা আৰু অসুবিধা অ-অংশগ্ৰহণকাৰী পৰ্যবেক্ষণ: অৰ্থ; সুবিধা আৰু অসুবিধা; অংশগ্ৰহণকাৰী আৰু অঅংশগ্ৰহণকাৰী পৰ্যবেক্ষণৰ মাজত সাদৃশ্য আৰু পাৰ্থক্য

অধ্যায় ১০: নিৰ্বাচিত অধ্যয়ন (Case Study)

অৰ্থ; নিৰ্বাচিত অধ্যয়নৰ উদ্দেশ্য আৰু বৈশিষ্ট্য, নিৰ্বাচিত অধ্যয়নৰ ৰূপ; নিৰ্বাচিত অধ্যয়নৰ পদক্ষেপ, নিৰ্বাচিত অধ্যয়নৰ বাবে তথ্য সংগ্ৰহৰ উৎস, নিৰ্বাচিত অধ্যয়নৰ তাৎপৰ্য আৰু গুৰুত্ব; নিৰ্বাচিত অধ্যয়নৰ সুবিধা আৰু অসুবিধা

অধ্যায় ১১: ফোকাচ গ্ৰুপ অধ্যয়ন

ফোকাচ গ্ৰুপ অধ্যয়নৰ অৰ্থ; বৈশিষ্ট্য, ফোকাচ গ্ৰুপ অধ্যয়নৰ পদক্ষেপ/পৰিচালনা; তাৎপৰ্য; ফোকাচ গ্ৰুপ অধ্যয়নৰ সুবিধা আৰু অসুবিধা

অধ্যায় ১২: গৱেষণাৰ নৈতিক প্ৰমূল্য

নৈতিকতা: সংজ্ঞা, পৰিচয় আৰু গুৰুত্ব; বৌদ্ধিক সততা আৰু গৱেষণাৰ সততা; ভুৱা ৰচনা আৰু লেখা-চোৰ (fabrication, falsification, or plagiarism); অতিৰিক্ত প্ৰকাশন: নকল আৰু অধিক্ৰমণ (Overlapping) প্ৰকাশন, নিৰ্বাচিত প্ৰতিবেদন আৰু তথ্যৰ ভুল উপস্থাপন; প্ৰকাশন নৈতিকতা, লেখকস্বত্ব আৰু সহযোগিত্বৰ উলংঘা; কুস্তীলকবৃত্তি নিবাৰণৰ বিভিন্ন চফট্-ৱেৰ সঁজুলি, কপিৰাইট আৰু স্ব-আৰ্কাইভিং নীতিসমূহ

অধ্যায় ১৩: তথ্যসূত্ৰ লিপিবদ্ধকৰণৰ পদ্ধতি- চমু আভাস

তথ্যসূত্ৰ লিপিবদ্ধকৰণ : অৰ্থ; সংজ্ঞা আৰু প্ৰকাৰভেদ; প্ৰত্যেকটো পদ্ধতিৰ চমু আভাস (MLA, APA, Chicago Citation Style etc.)

অধ্যায় ১৪: গৱেষণাৰ প্ৰতিবেদন লিখন

প্ৰতিবেদন লিখা: গৱেষণা প্ৰতিবেদনৰ অৰ্থ, পদক্ষেপ, বিষয়বস্তু, কাৰিকৰী দিশ আৰু গুণ

Reading List:

- Bora, D. (2017). *Gaveshana Paddhati: Bitarka Aru Siddhanta*. Guwahati: Rekha Prakashan.
- Bora, M (2009). *Gaveshana Pranalitattva*. Guwahati: Banalata.
- Bujarbaruah, P. D. (2017). *Gaveshana Paddhatibigyan*. Guwahati: Banalata.
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Delhi: New Age International (P) Limited, Publishers.
- Saikia, N (2018). *Gaveshana Paddhati Parichay*. Dibrugarh: Kaustubh Prakasan.
- Young, P.V. (1988). *Scientific Social Survey and Research*, New Delhi Prentice Hall.

Detailed Syllabi of Value Added Courses (VACs)

VAC 101

Environmental Studies and Disaster Management

Course Objectives

- Help the undergraduate students to obtain in-depth knowledge on natural processes and resources that sustain life and govern economy.
- Understand the consequences of human activities on the environment, global economy, and quality of human life.
- Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.

Course Outcomes

- Interpret the impacts of human activities on the environment.
- Comprehend the importance of natural resources and its conservation
- Recognize the disasters and Hazards and enable the new generation to face the new challenges.
- Encourage engaging in hazard and disaster related learning in order to develop measures for mitigation.

Syllabus

UNIT 1: CONCEPT OF ENVIRONMENTAL STUDIES

Definition of Environmental Studies and its Scope Environmental Studies and its Multi-Disciplinary, Nature; Rules and Regulations of Environmental Studies and Public Awareness

UNIT 2: NATURAL RESOURCES

Natural Resources; Types of Natural Resources; Forest Resources; Water Resources; Mineral Resources; Food Resources; Energy Resources; Land Resources; Conservation of Natural Resources; Sustainable Development

UNIT 3: ECOSYSTEM

Ecosystem; Food Chain; Food Web; Energy Flow; Ecological Pyramid; Main Ecosystems

UNIT 4: BIODIVERSITY AND ITS CONSERVATION

Definition of Biodiversity; Values of Biodiversity; Biodiversity at Global, National and Local Levels; Hotspots of Biodiversity; Endangered and Endemic Species; Threats to Biodiversity Conservation of Biodiversity

UNIT 5: ENVIRONMENTAL POLLUTION

Environmental Pollution-Definition; Air Pollution; Water Pollution; Soil Pollution; Noise Pollution; Thermal Pollution; Role of Individual in Prevention of Pollution

UNIT 6: CONCEPT OF DISASTER

Defining Disasters; Types of Disasters; Difference Between Hazard: Disaster, Risk and Vulnerability; Causes, Effects and Mitigation Measures of Some Natural Disasters; Man-made Disasters

UNIT 7: DISASTER MANAGEMENT

Disaster Management; Safety Measures Immediately before a Disaster; Emergency Aid; Methods or Steps Taken for Disaster Management; NGO and Participation of Civil Society; Regional Disaster Management and Planning

Activities:

- Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
- Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river

Reading List

- Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
- Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
- Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
- Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
- Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
- Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
- McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
- McNeil, John R. 2000. Something New Under the Sun: An Environmental

VAC 201

Introduction to Yoga

Course Objectives

One Course on Foundation of Yoga of four credit aims to promote positive health, prevention of stress related health problems and rehabilitation in a proper way. It aims to approach cure common ailments and imparting skills in them to introduce Yoga for health is for general public.

Course Outcomes

This Yoga course is designed for total personality development of students in Colleges and Universities. It will invoke scientific attitude and team spirit to channelize their energies in to creative and constructive endeavours. The syllabus of this course will fulfil these objectives containing one theory paper of hundred marks.

Syllabus

UNIT 1: INTRODUCTION TO YOGA

Definition, principles, goals and benefits of yoga

UNIT 2: A NOTE ON PATANJAL YOGA SUTRA

Description, classification,

UNIT 3: A NOTE ON GHERANDA SAMHITA

Brief Introduction, Important Asanas

UNIT 4: A NOTE ON HATHA YOGA PRADIPIKA

Brief Introduction, Important Pranayamas

UNIT 5: INTRODUCTION TO AYURVEDA

Meaning, Origin, Benefits

UNIT 6: PRINCIPALS OF AYURVEDA

Aim, objective, Laws of Healing

UNIT 7: SWASTHA VRITTA

Symptoms, Significance, Daily routine for health

UNIT 8: INTRODUCTION TO ALTERNATIVE SYSTEM OF MEDICINES

Definition, Types, Methods, Benefits

UNIT 9: PRINCIPLES OF DIET IN YOGA AND AYURVEDA

Classification of food, rules, Foods to be taken

UNIT 10: INTRODUCTION TO INDIAN PHILOSOPHY

Classification of Schools, Development, Characteristics

UNIT 11: YOGA IN ANCIENT SANSKRIT TEXT

Tradition of Yoga in Ancient Indian Literature

UNIT 12: YOGA PRACTICE FOR NON-COMMUNICABLE DISEASES

The Key Facts of non-communicable diseases

UNIT 13: RELEVANCE OF YOGA THERAPY WITH MODERN MEDICAL SCIENCE

Principles of Yoga therapy, Components, Relevance

UNIT 14 YOGA THERAPY FOR COMMON DISORDERS

Yoga therapy for Various Common disorders

UNIT 15 YOGA THERAPY FOR MENTAL ILLNESS

Yoga therapy for Various Mental disorders

Reading List

Mukta Biswas: Samkhya Yoga Epistemology, D K Print world Pvt. Ltd, New Delhi
S RadhaKrishnan: Indian Philosophy, Vol. II, Oxford University Press, New Delhi
S N Dasgupta: Yoga as Philosophy and religion, Motilal Banarashidas, Delhi