THE KERALA STATE HIGHER EDUCATION COUNCIL

HANDBOOK FOR MASTER TRAINERS

IN KERALA STATE HIGHER EDUCATION CURRICULUM FRAMEWORK FOR UNDERGRADUATE EDUCATION

OCTOBER 2023

Handbook
For
Master Trainers

in

Kerala State Higher Education Curriculum Framework

For

Undergraduate Education

Kerala State Higher Education Council

October

2023

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INTRODUCTION

The Government of Kerala have introduced the four-year undergraduate programmes in 2023. The document has been widely circulated among the stakeholder groups since then and could garner extensive deliberations within the academic community. Universities and autonomous Institutions have the pivotal role to design the respective curriculum and individual courses in accordance with the fundamental elements of this FYUGP framework. The Kerala Curricular Framework for Four Year Undergraduate Programmes referred as Kerala Curricular Framework has been conceptualised & brought in to practice after the Government have constituted an expert committee to look after the curricular reforms in higher education sector based on the recommendations of the Commission set up by the Government for suggesting general reforms in Higher Education during 2022. While borrowing the fundamental structure of UGC's Curriculum and Credit Framework for FYUGP introduced in 2022, the Kerala Curricular Framework document has been conceived as a more befitting alternative to the reforms proposed in National Education Policy 2020 especially in the State Specific context.

The framework document proposed by the committee ensured that the process of the design of the new Curriculum Framework ensures depth in knowledge and clearly articulates ways to attain it through active learning. Curriculum Framework refers to how syllabuses of Programmes are structured, Courses designed, and schemes of education prepared and translated into teaching and learning.

This comprehensive guide designed to empower master trainers with the knowledge, strategies, and resources needed to lead and facilitate the transformative process of curriculum redesign for four-year UG programs in the State of Kerala. Curriculum redesign is a dynamic and essential endeavour in higher education, ensuring that programs remain relevant, effective, and responsive to the evolving needs of students, employers, and society. This handbook provides a structured framework, practical insights, and a wealth of best practices to guide you through every step of the curriculum redesign journey. Whether you are an experienced educator or new to the role of a master trainer, this resource will equip you to shape the future of UG education, foster innovation, and enhance student learning outcomes. We invite you to embark on this educational adventure, where your expertise will contribute to creating a curriculum that prepares students for success in a rapidly changing world.

master trainers can easily navigate and reference throughout the curriculum redesign process with the help of user-friendly handbook

It is essential to have a well-structured and user-friendly handbook that master trainers can easily navigate and reference throughout the curriculum redesign process. Regular updates and opportunities for feedback should also be integrated to ensure this handbook remains as a valuable resource.

PURPOSE AND SCOPE OF THE HANDBOOK

This handbook is designed to serve as a comprehensive and invaluable resource for master trainers engaged in the critical task of curriculum redesign for undergraduate programs. Its primary purpose is to empower master trainers with the knowledge, strategies, and practical guidance needed to lead curriculum redesign initiatives effectively. By providing a structured framework, best practices, and a wealth of resources, this handbook aims to facilitate a transformative process that ensures UG programs remain relevant, student-centered, and aligned with the evolving needs of education and industry.

The scope of this handbook encompasses a wide range of essential topics and areas of focus relevant to curriculum redesign in UG programs. The following key areas are included:

- Understanding the Landscape: Master trainers will gain insights into the changing educational landscape, including emerging trends, student expectations, and industry demands.
- Curriculum Assessment: The handbook provides guidance on conducting comprehensive assessments of existing UG program curricula, identifying strengths and areas for improvement.
- Learning Outcomes: It offers strategies for defining clear and measurable learning outcomes that align with program goals and accreditation standards.
- Pedagogy and Assessment: Master trainers will find insights into effective teaching and assessment methods, including active learning strategies, technology integration, and diverse assessment tools.
- Stakeholder Engagement: The handbook addresses the importance of involving various stakeholders, such as students, faculty, industry partners, and alumni, in the redesign process.
- Quality Assurance: It discusses quality standards and accreditation requirements, ensuring that the redesigned curriculum meets the highest educational benchmarks.
- Implementation and Evaluation: Master trainers will learn how to develop implementation plans, monitor progress, evaluate outcomes, and make necessary adjustments for continuous improvement.

- Resources and Tools: The handbook offers a repository of templates, checklists, case studies, and recommended resources to support curriculum redesign efforts.
- Professional Development: It emphasizes the importance of ongoing professional development for faculty and provides resources to enhance teaching skills.
- Diversity and Inclusion: The scope includes guidance on incorporating diversity, equity, and inclusion principles into curriculum redesign to create inclusive and equitable learning experiences.
- Interdisciplinary Approaches: Strategies for encouraging interdisciplinary connections within the curriculum to promote holistic learning are also covered.
- Acknowledging Evolving Trends: As the educational landscape continues to evolve, this handbook remains adaptable and open to incorporating emerging trends and best practices.

This handbook is intended to be a dynamic and evolving resource that adapts to the changing needs of master trainers and the higher education community. It serves as a practical guide and reference tool to foster innovation and enhance the quality of UG education. Ultimately, its scope is aligned with the overarching goal of equipping master trainers with the expertise to shape the future of UG programs and prepare students for success in a rapidly changing world.

THE CONTEXT

A curriculum framework refers to the fundamental structure and design principles that guide the development of educational programs in higher education institutions. The concept is grounded in the principles of curriculum design, which aim to provide a structured and comprehensive educational experience for students pursuing a specific academic degree.

The Kerala State Higher Education Council is invested with the responsibility to provide institutional leadership in mobilising expert opinions for reforming Higher Education for the State. Being the legislatively ordained agency to oversee the entire operation of the implementation of the higher education reforms in the State, the KSHEC functions as the official headquarters of all related Commissions pertains to this sector. Accordingly, the Government has created an in-built co-ordination Cell under the KSHEC for facilitating the implementation of the reforms recommended by the Commission, which was earlier constituted for reforms in Higher Education in the State.

The Commission has addressed the concerns all stakeholder groups and the prevailing regulations, the evaluation system, conduct of examinations, announcement of results, and distribution of certificates, lack of employability of students etc. Confluence of all these limitations have made the higher education in the State less attractive. Obsolescence of the Curriculum and Courses has been adding to the unpopularity. Although there have been earlier reforms, there hardly made any paradigm shift in curricular change. A major preceding reform in the State was the introduction of Credit Based Courses and Semester System

(CBCSS) in 2009-10 with an entailing curricular design, but this had not been expanded and appropriately implemented.

The newly appointed commissions - one for changing the higher education curriculum and the other two for redesigning the examination system and amending the existing rules to ensure legal support for the reforms brought forward significant recommendations. As recommended by the Commission, the Government constituted a Curriculum Committee with Dr. Suresh Das as the Chairman to work out the details of the proposed Curricular Framework under the auspices of the KSHEC. This Curriculum Committee after examining various aspects and detailed deliberations has prepared the Curriculum Framework Document made important recommendations including the Guidelines for Foundation Courses, Curriculum Perspective, Curriculum Components, Credit Structure.

It is emphasised that the central objective of the Undergraduate Curriculum the Government of Kerala has envisioned building of a strong knowledge society which can help develop and sustain a knowledge economy. The current higher education system is mostly focused on teaching, with teachers' roles limited to imparting facts while students' roles are limited to memorization and reproducing these facts during exams. Conceptual understanding, applicability to everyday life, logical analysis, and problem solving are all given very little consideration. Our system presently relies more on regulations with a focus on discipline-based syllabi which provides very few opportunities for interdisciplinary and multidisciplinary learning, lack of early-stage exposure to research, a weak ecosystem for innovation and low levels of industry engagement

In recognition of this gap and the view of the Government to develop Kerala as a knowledge society, it becomes necessary that we strengthen undergraduate programmes with curricula that can equip students with the knowledge base, intellectual abilities, a worldview, flexible skill sets and the basic expertise that will make them effective citizens in a knowledge society and offer them multiple employment options. Undergraduate studies should ideally lay the foundation for the development of broad intellectual skills and other competences that enable transfer and application in a wide range of practice. The disciplinary training at the undergraduate level (as the word ‘discipline’ connotes) is more to develop structures of thought, inquiry, exploration, expression, attitudes, sensibilities, habits, and abilities associated with teamwork, than to commit to memory a large array of information, often in a disconnected manner (KCFFUGP, 2023).

ROLE AND RESPONSIBILITIES OF MASTER TRAINERS

To successfully reform undergraduate programmes, master trainers' roles and duties in the curriculum redesign process are essential. Master trainers take the initiative to direct and coordinate the redesign process. They serve as experienced educators and experts in curriculum design and pedagogy. They take on a leadership role in driving the curriculum redesign process for UG programs.

The role and responsibilities of master trainers in the curriculum redesign process are pivotal to the successful transformation of undergraduate (UG) programs. Master trainers play a leadership role in guiding and facilitating the redesign effort. Here's a clarification of their key role and responsibilities:

- Leadership: Master trainers provide vision and leadership for the curriculum redesign initiative. They help define the overarching goals and outcomes of the redesign effort and ensure alignment with institutional objectives.
- Guidance: They offer guidance and expertise to faculty members and other stakeholders involved in the process. Master trainers act as mentors and facilitators, helping teams navigate the complexities of redesign.
- Decision-Making: Master trainers participate in decision-making processes related to curriculum changes. They work collaboratively with curriculum committees and academic leaders to make informed decisions about program modifications.
- Quality Assurance: Ensuring that the redesigned curriculum meets high-quality standards is a critical responsibility. Master trainers help establish quality benchmarks and review the curriculum to ensure alignment with those standards.
- Assessment: They guide the development of assessment strategies and methods that align with the learning outcomes and program objectives. Master trainers assist in the creation of effective assessment tools and rubrics.
- Resource Allocation: Master trainers may be involved in resource allocation decisions, including budgeting for materials, faculty development, technology, and other resources needed for successful curriculum redesign.
- Stakeholder Engagement: They facilitate engagement with stakeholders, including students, faculty, industry partners, and accreditation bodies. Master trainers ensure that the perspectives and needs of all stakeholders are considered in the redesign process.

Master Trainers will have the responsibility to that contribute to the overall success of curriculum redesign. They shall provide guidance, expertise, and support to faculty and stakeholders. Their responsibilities span the entire redesign journey, from needs assessment to implementation and ongoing evaluation. Their expertise and leadership are instrumental in shaping a curriculum that aligns with educational goals and prepares students for success in a changing world.

- Needs Assessment: Conduct a comprehensive needs assessment to understand the current state of the curriculum, identify areas for improvement, and gather input from stakeholders.
- Learning Outcomes: Collaborate with faculty to define clear and measurable learning outcomes that align with program goals and accreditation standards.

- Pedagogical Expertise: Share expertise in pedagogical strategies, instructional design, and effective teaching practices with faculty members involved in the redesign.
- Curriculum Mapping: Help faculty map the curriculum to ensure that learning outcomes are addressed systematically throughout the program.
- Assessment and Evaluation: Assist in developing assessment methods, tools, and rubrics that align with learning outcomes and support ongoing evaluation of the curriculum.
- Professional Development: Identify opportunities for faculty development and support related to curriculum redesign, ensuring that faculty members are well-prepared for the changes.
- Inclusivity: Promote diversity, equity, and inclusion principles in the redesigned curriculum, making it accessible and inclusive for all students.
- Quality Assurance: Ensure that the redesigned curriculum meets quality standards and accreditation requirements. Participate in accreditation processes as needed.
- Timeline and Milestones: Develop a timeline and milestones for the redesign project, keeping the process on track and within established deadlines.
- Communication: Facilitate effective communication among faculty members, curriculum committees, and other stakeholders to ensure transparency and collaboration throughout the redesign process.
- Continuous Improvement: Encourage a culture of continuous improvement, where feedback and data are used to refine the curriculum over time.
- Adaptability: Stay informed about emerging trends and best practices in higher education and adapt the curriculum as needed to remain current.

PART II

Outline of Kerala Curriculum Framework

The new Curriculum Framework proposed by the Government of Kerala for the Four Year Undergraduate Programme (FYUGP) intends to provide opportunity that can enable students to acquire competence in using digital technologies, computational methods, order statistics, data analytics, and other skills essential to participate in the knowledge economy. Foundation Courses are with the knowledge base and skills as learning outcomes. The UGC has also made it mandatory and circulated a Curricular Framework and Credit System for the Four-Year Undergraduate Programme model course design with allocation of credits for all universities to adopt.

The salient features of the Kerala State Higher Education Curriculum Framework:

- The Framework is formulated with a student centric approach and provides maximum flexibility in terms of choice of disciplines of study and it allow to move from one discipline of study to another.
- It has the options for developing various academic pathways by a creative combination of disciplines of study.
- The students are getting a chance to determine his/her own semester-wise academic load and will be allowed to learn at his/her pace, to the extent possible.
- Increase in the number of choices of courses available to students and the students are getting an opportunity to choose the courses of their interest from all disciplines.
- This Framework provides multidisciplinary and holistic education with emphasizes on research, skill development and higher order thinking,
- The frame work promote innovation and employability of the student.
- The frame work offers flexibility for the students to move from one institution to another as per their choice.
- The frame work offer the flexibility to switch to alternative modes of learning (offline, ODL, and online learning, and hybrid modes of learning).

In the case of Foundation or introductory courses, UGC has stated that they are intended for students to gain an understanding and basic knowledge about the subjects and help decide the subject or discipline of interest. These courses may also be prerequisites for courses in the major subject. These courses generally would focus on foundational theories, concepts, perspectives, principles, methods, and procedures of critical thinking in order to provide a broad basis for taking up more advanced courses.

These courses seek to equip students with the general education needed for advanced study, expose students to the breadth of different fields of study; provide a foundation for specialized higher-level coursework; acquaint students with the breadth of (inter) disciplinary fields in the arts, humanities, social sciences, and natural sciences, and to the historical and contemporary assumptions and practices of vocational or professional fields; and to lay the foundation for higher-level coursework (CCFUG, 2019).

The Kerala Curricular Framework have provided necessary stipulations regarding the Foundation Courses. It recommends that Undergraduate studies should ideally lay the foundation for the development of broad intellectual skills and other competencies that enable transfer and application in a wide range of practices

The new framework focussed on the essential components like:

(a) Technology Enablement, which integrates and utilise various technologies to enhance and support the teaching, learning, administrative, and research functions within higher education institutions. This process involves leveraging digital tools, software applications, hardware, and online resources to improve the overall educational experience and administrative efficiency.

(b) Self-learning, often referred to as self-directed learning or independent study, is a critical skill and approach for students pursuing advanced degrees. It involves taking control of one's own learning process, setting goals, choosing resources, and managing one's time and effort effectively. This will foster a sense of autonomy, curiosity, and lifelong learning. It is a valuable skill that extends beyond formal education and can benefit individuals in their careers and personal development.

c) Active Learning, an instructional approach and educational philosophy that emphasizes student engagement and participation in the learning process. It stands in contrast to traditional passive learning methods, where students primarily listen to lectures or read textbooks without actively applying, discussing, or critically engaging with the material. In higher education, active learning is seen as a powerful method for enhancing student understanding, retention, and critical thinking skills.

(d) OBE, or Outcome-Based Education, which is an educational approach and philosophy that focuses on defining specific learning outcomes or competencies that students should demonstrate by the end of a course or program. It has gained prominence in higher education as a means to ensure that education is learner-centered, results-oriented, and aligned with the needs of society and employers. Accordingly, every programme of study lends itself to well-structured and sequenced acquisition of knowledge and skills. Practical skills, including an appreciation of the link between theory and practice, will constitute an important aspect of the teaching-learning process.

The detailed model for UG Curricular framework for the State Higher Education Institutions have been provided in the document prepared Kerala State Curriculum Committee for Higher Education constituted vide GO (Rt) No. 35/2023 HEdn. dated 06.01.2023.

It is brought through the document that all Courses under the new framework requires OBE based design which postulating carefully determined Learning Outcomes, ensuring the attainment of Programme Outcomes or Graduate Attributes, Programme Specific Outcomes and certainly the individual Course Outcomes. Universities have to determine the Graduate Attributes and required Learning Outcomes involving the necessary amount of difficult and moderate cognitive tasks as attached to Courses in order to turn the students into accomplished graduates of competency. It necessitates adoption of appropriate teaching methods to help students attain the anticipated Learning Outcomes.

STEPS TO BE FOLLOWED FOR THE SUCESSFUL INMPLEMENTATION OF FYUGP

- Implement the semester system in its true spirit with prominence for credits, rather than fixed duration, so that there can be variable lengths/durations for programmes
- Possibility for students to return to a programme after a break, within a stipulated time
- Courses and programmes made contemporary with a focus on critical thinking and innovation.
- Decentralisation of the higher education system with curriculum broadly set by the university, and syllabi determined by teachers in colleges with provisions for regular revisions and updating of the syllabi in colleges and reported to the Board of Studies of the university
- More elective courses that reflect the specialisations and interest of the teachers and students, factoring in the employment/professional potential in each discipline.
- A system of course clusters and a minimum requirement of courses from each cluster so that students are encouraged to elect courses from other disciplines; a cross-listing of courses so that students are encouraged to take courses of their interest from other departments or programmes.
- Flexible timings of classes to accommodate more class hours to enable more elective courses across departments or programs.
- Since the thrust is to enhance the capability of a student to create new knowledge, the curriculum ensures flexibility to design Courses that enable to access knowledge from multiple disciplines.
- Students to be introduced with the concept of philosophy, social psychology and many other fields in a single Course itself, which would bridge the gap between classroom-based teaching and community-based service learning and also should bridge the gap between learning rough printed text and other media.
- There should be enough opportunities for crossing the discipline boundaries that offers opportunities to explore the complexity of the world and society.
- The curriculum should help to develop more democratic classrooms and it should promote the co-creation of knowledge where the students and teachers should be able to work collaboratively with one another.
- In this context, a liberal approach has to be the basis of undergraduate education in all fields and disciplines at the undergraduate level, including professional education.

- Undergraduate curriculum needs to be focused on creativity and innovation, critical thinking and higher-order thinking capacities, problem-solving abilities, teamwork, communication skills, more in-depth learning and mastery of curricula across fields.
- The FYUGP framework offers flexible and multidisciplinary undergraduate programs which is a fundamental transformation of the current undergraduate education and intend to replace the conventional undergraduate programs of universities in the State.
- Outcome Based Education (OBE) practices are to be used to design the curriculum. It is proposed to develop Graduate Attributes at the appropriate level which will act as a common denominator for curriculum across universities. The curriculum shall focus on critical thinking and problem-solving.
- The curriculum proposed here aims at synthesizing degrees. Synthesizing degree is now an international standard adopted by all the universities all across the world.

Kerala has a legacy of providing quality education to its pupil, in order to maintain the higher standards of such education the committee recommends that the degree to be synthesized as per the choices of the individual learner. While synthesizing their degrees, there shall be no bar or restriction on the subjects/courses across the disciplines.

STRUCTURE OF FYUG PROGRAMMES

The FYUGP framework of Kerala has recognised the importance that we must prepare the youth for a future that is in the hands of the Knowledge Economy, a widely networked global system. The knowledge economy demands a greater focus on science, digital/information technology, engineering and mathematics at all levels of education as the basic essential literacy for innovation. The new framework has provided an overall redesign strategy to be adaptable to the specific needs and context of the UG program, allowing master trainers and stakeholders to follow a systematic and evidence-based approach to curriculum transformation. It emphasizes stakeholder engagement, alignment with learning outcomes, ongoing assessment, and a commitment to quality assurance and continuous improvement.

Possible Programme pathway options available for the students

- 3-year UG Degree: Students who wish to exit after 3 years of a 4 year degree programme then he will be awarded UG Degree in the Major discipline after successful completion of three years, securing specific number of credits (133 or above) and satisfying the minimum course requirement as given in tables.
- 4-year UG Degree (Honours): A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with the specific number of credits (177 or above) and have satisfied the minimum course requirement as given in tables. Honors students not undertaking research project will do 3 courses for 12 credits in lieu of a research project / Dissertation

- 4-year UG Degree (Honours with Research): Students who are highly motivated to opt research as their carrier can choose honours with research stream in the fourth year. The selection criteria for this stream can be as per the guidelines of UGC/respective universities. They should do a research project or dissertation under the guidance of a faculty member of the University/College. The research project/dissertation will be in the major discipline. The students who secure 177 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

CURRICULAR STRUCTURE OF FYUGP

a) Foundation Components (4 major course baskets)

- Ability Enhancement courses (AEC)
- Skill enhancement Courses (SEC)
- Value addition courses (VAC),
- Multi-disciplinary courses (MDC)

b) Discipline Specific Pathway components (Major/Minor)

- Discipline Specific Core course (DSC) (Level 100- 300)
- Discipline Specific Elective Courses (DSE) Level 300
- (DSC courses at Level 100 are for building the foundations)

c) Discipline Specific Capstone Components.

- Advanced DSC and DSE courses (Level 400)
- Projects, field training internship, community activity etc
- (Any programs to promote experiential learning)

Credit structure of the FYUG Degree Programme

A. General foundation Courses:

- It is mandatory for all students who enrolled for a FYUG degree programme need to acquire 39 credits from general foundation courses which are classified in to four different sub categories (approximately about 30% credit decided for the three-year programme)
- The Suggested credit distribution for each of the sub category of General foundation Courses are given below

General Foundation Courses

Sl NO	Name of the General Foundation Courses	Required Credit
1	Ability Enhancement Courses (AEC)	12
2	Skill Enhancement Courses (SEC)	09
3	Value Added Courses (VAC)	09
4	Multi-disciplinary Courses (MDC)	09

B. Discipline Specific foundation and pathway courses for 3 year Degree

- The student who wish to exit with a degree after three years need to acquire 94 credits from Discipline specific foundation, pathway and capstone level courses approximately about 70% of the credit decided for the three year programme.

- The Suggested credit distribution for each of the sub category of Discipline specific Courses are given below

Discipline Specific Foundation/Pathway Courses

Sl NO	Name of the Pathway Courses	Required Credit
1	Major Pathway Courses	68
2	Minor Pathway Courses	24
3	Internship/Aprentiship	02

C. Discipline Specific foundation and pathway courses for four-year Honours Degree

The student who wishes to continue for the fourth year for their honours degree they should successfully complete 133 credits in first 3 years and should acquire 44 credits during their fourth year. Out of which 32 credits in should be from the major discipline at the Capstone level 12 credits can be from a minor pathway

Sl NO	Name of the Pathway Courses	Required Credit
1	Major Capstone Level Pathway Courses	12
2	Major Capstone level Specialisation/electives (online/blended courses)	8
3	Minor pathway courses/additional minor	12
4	Capstone /research project	12

Honours students may opt to do three capstone level/PG level courses instead of the capstone project. Students opt for honours with research programme it is mandatory to complete a research project with original research

Possible Programme pathway options available for the students

a) Degree with single Major: This pathway may be recommended to those students who wish to an in-depth study in a particular discipline without systematically explore any specific minor pathways .The student pursuing the FYUG Degree programme in a specific discipline shall be awarded a Major degree

if he secures in that Discipline at least 50% of the total credits required for the award of the Degree in that Discipline. The remaining credits the learner may acquire either from the same discipline or as some open elective papers from other disciplines apart from the foundation papers.

Eg : BSc Physics Major/BA Economics Major /BCom Commerce Major

Details: A student pursuing the FYUG Degree Programme in Chemistry can be awarded a BSc with Chemistry Major if he secures 68 credits or more from approximately 17 pathway courses in chemistry, out of which 10 courses should be above level 300. Similarly, he may be eligible for an Honours degree with Chemistry major if he earns 88 credits or above from 22 pathway courses in Chemistry, out of which 5 papers should be above level 400.

b) Degree Major with Minor: This pathway may be recommended to those students who wish to an in-depth study in more than one discipline with a more focus on one discipline (major) and relatively less focus on the other (minor) .If a student pursuing the FYUG Degree Programme is awarded a Major Degree in a particular discipline, he is eligible to be awarded a Minor in another discipline of his choice, if he earns a minimum of 34 credits (approximately 25% of credit required for the three-year programme) from 8-9 pathway courses in that discipline: Provided that the concept of Minor is relevant only when there is a Major discipline.

Eg : BSc Physics Major With Chemistry Minor/BSc Chemistry Major With English

Minor BCom Major With Economics Minor/ BA English Major with Functional English Minor/ BA Hindi Major with Malayalam Minor

c) Major with multiple disciplines of Study: This pathway is recommended for students who wish to develop core competency in multiple disciplines of study. In this case, the credits for the minor pathway shall be distributed among the constituent disciplines/subjects. If a student pursuing FYUG Degree Programme is awarded a major Degree in a particular discipline, he is eligible to get mentioned his core competencies in other disciplines of his choice if he has earned 12 credits from the pathway courses of that discipline.

Eg. BSc Physics Major with Chemistry and Mathematics, BA Economics Major with History and English, BCom Major with Economics and statistics

d) Interdisciplinary Major: For these programme pathways, the credits for the major and minor pathways shall be distributed among the constituent disciplines/subjects to attain core competence in the interdisciplinary programme.

Eg BA Econometrics Major, BSc Global Studies Major

For example a student can be awarded a major in econometrics If he /she secures 70% of relevant credits from Economics, Statistics, and Mathematics suitable to develop the required level of core competency in the field of Econometrics. The BOS shall determine the required percentage of credits

in these interdisciplinary areas and the relevant discipline specific courses from all these three subjects and should list it separately.

e) Multi-disciplinary Major: For multidisciplinary Major pathways, the credits for the major and minor pathways will be distributed among the broad disciplines such as Life sciences, Physical Sciences, Mathematical and Computer Sciences, Data Analysis, Social Sciences, Humanities, etc.

Eg BSC Life Science, BSc Data Science, BSC Nano Science,BSc Biotechnology

For getting a multidisciplinary major he or she should secure the 70% of relevant credits from the core areas which formulate the multidisciplinary.

f) Degree with Double Major: A student has to secure a minimum of 50% credits from the first major will be awarded a second major in another discipline if he could secure 40% of credit from that discipline for the 3-year/4-year UG degree to be awarded a double major degree .

Eg BSc Physics and Chemistry Major, BA Economics and History Major, BA Economics and History Major BCom Commerce and Management Major.

For example BSc with Physics Major and Chemistry Major can be awarded to a student if he/She secures 68 credits, including some relevant credits to chemistry from the Physics discipline, and 54 credits, including some relevant credits to Physics from the Chemistry discipline. Students who wish to opt for a double major may either have to acquire extra credits from Physics and chemistry disciplines or include the credits earned by them (if any) from the multidisciplinary courses, Skill courses, and Value audition courses offered by the respective departments to secure the required 54 credits in each discipline. 10% of the credits secured from physics should be relevant for Chemistry and vice versa.

Note: The determination of the list of relevant courses under the major category and the required percentage of credit distribution for double major, interdisciplinary major and multidisciplinary major shall rest with the statutory board of studies/academic council.

General Foundation courses in the Undergraduate curriculum:

General Foundation courses are common for all students which can be grouped in to 4 major baskets such as (1)Ability Enhancement courses(AEC), (2) Skill enhancement Courses(SEC) , (3) Value addition courses(VAC) , (4)Multi-disciplinary courses(MDC) . All these courses are proposed as 3 credit courses. The ability Enhancement Courses (AEC) and Skill Enhancement Courses can include practicum components as well. The Students shall complete 12 credits (4 courses) from AEC, 9 credits (3 courses) from SEC, 9 credits(3 courses) from VAC and 9 credits(3 courses from MDC as part of their UG program.

(1) Ability Enhancement Courses (AEC) These are the courses designed specifically to achieve competency in modern Indian languages and English with special emphasis on language and communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic writing skills, they would also

enable students to acquaint themselves with the cultural and intellectual heritage of the chosen language

(2) Skill Enhancement Courses (SEC) . These courses are to be designed to develop 4Cs – Creativity, Critical Thinking, Communication and Collaboration which are also known as the 21st century skills. This are important for students to survive and work in any local or global workplace. Apart from this They can be some courses which can help the students to develop adequate Professional Skills, Leadership and management skills

(3) Value added courses (VAC): These are the courses meant for the personality development and perspective building and developing self-awareness of a graduate student. These courses will help the students to identify themselves and their true feelings, thoughts, abilities and actions. Which will empower them to recognize their strengths and gives insights to overcome the challenges. As a result the learner will be able to develop confidence, right mindset and emotional intelligence. Some of the possible courses under this category could be self and identity, theatre, music sports and games, Indian Constitution, Indian Society and Economy, Environment and Climate Change, Gender and Social Equity, History of thought. NSS/NCC related activities, Diversity, and Inclusion, Ethics and Values, IT Skills Science, Technology and Society

(4) Multi Disciplinary Courses (MDC) : These are the three credit courses intended to broaden the intellectual experience and to build conceptual foundation about arts, science, commerce, language and Social sciences among students. All UG students are required to undergo 3 introductory-level MDC c relating to any of the broad disciplines other than they studied or presently studying. The syllabus of introductory paper of a subject should aims to develop a coherent view of essential concepts, structures, and intellectual methods that characterize the subject. The learning outcome of this paper would be to instill broad understanding and an appreciation of the subject.

Discipline Specific Pathway components (Major/Minor)

The Discipline Specific pathways provides the learner with an opportunity to pursue in-depth study of a particular subject or discipline and to develop competency in that subject. This includes Major courses, Minor courses and optional courses.

(i) Minor Component: These are a group of courses in a particular subject or theme that complement the main area of study. The Discipline specific core or discipline specific elective courses offered by the respective subjects can fall under this category. The minor can be related or unrelated to the main focus of study (major)

Implementation: Each BOS shall identify certain courses or baskets of courses offered by other BOS towards minor course credits in the curriculum. Students will have the option to choose courses from disciplinary/interdisciplinary minors and skill-based courses relating to a chosen vocational education programme. Students who take a sufficient number of courses in a discipline or an interdisciplinary area

of study other than the chosen major will qualify for a minor in that discipline or in the chosen interdisciplinary area of study. A student may declare the choice of the minor and vocational stream at the end of the second semester, after exploring various courses.

(ii) Major Component:

The major is the subject that is the main focus of study .By selecting a major the student would provide with an opportunity to pursue in-depth study of a particular subject or discipline. Students may be allowed to change major within the broad discipline at the end of the second semester by giving her/him sufficient time to explore interdisciplinary courses during the first year. . Major component consists of primarily three types of Discipline specific core or discipline specific elective courses research/laboratory/fieldwork.

Implementation: Core and elective courses are identified by each BOS from the courses Offered by them or from other BOS. These courses are clearly indicated in the program curriculum document along with their prerequisites.

Capstone level courses

The capstone level courses allows students to demonstrate their cumulative knowledge in their field of study. It plays a vital l role in preparing students for the world of work with practical applications with professional knowledge and skills. At this stage the student will understand how to use appropriate and relevant knowledge to ideas and products. Capstone level courses includes topics on specialized/advanced level, internships, community engagement and services, vocational training, professional training or other kinds of work experience.

(i) Advanced major (Specialization):

Advanced major courses includes courses with a focused area of study attached to a specific major which are optional in nature. These courses includes courses on research methodology as well. These courses will help the graduates to deepen their knowledge on a particular area of study with more focus and direction.

(ii) Summer Internship /Apprenticeship

This promotes the induction into actual work situations. All students will also undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other HEIs/research institutions during the summer term. Students will be provided with opportunities for internships with local industry, business organizations, health and allied areas, local governments (such as panchayats, municipalities), Parliament or elected representatives, media organizations, artists, crafts persons, and Agricultural sector. so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability.

(iii) Field-based learning/minor project: provide opportunities for students to understand the different socio-economic contexts. It will aim at giving students exposure to development-related issues in rural and urban settings.

(iv) *Community engagement and service* seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems

(iv) Vocational Education and Training: The ever-changing global scenario makes the world more competitive and requires high levels of lateral thinking and the spirit of entrepreneurship to cope up with the emerging challenges. Many a times, the defined skill sets that are being imparted to students today with Programme Specific Objectives in our educational institutions are become redundant sooner than later due to rapid technological advancements. No university curriculum can adequately cover all areas of importance or relevance. It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes

The vocational and skill enhancement courses are designed to provide necessary skills to increase the employability quotient and equipping the students with essential skills to succeed in life. The main objectives of the Skill enhancement and vocational courses are to provide students an understanding of the expectations of industry, to improve employability skills of students. to bridge the skill gaps and make students industry ready, to provide an opportunity to students to develop inter-disciplinary skills. To mould students as job providers rather than job seekers.

Implementation: The vocational Education and training should be designed for a minimum of 10 credits which will include a Specific job oriented additional Skill Enhancement course and job-specific internship/apprenticeship. Student may opt this either as a minor stream course or as an additional skills-enhancement course at the exit level to ensure, job-ready competencies required to enter the workforce. Student who wish to exit after three years may be advised to complete the vocational training. The vocational courses would involve Workshop/field -based activities requiring engagement of students in hands-on activities related to work/vocation or professional practice. The institutions may have to identify govt accredited agencies for providing vocational training and intern ships.

(v) Capstone Project/ Research Project / Dissertation

Students choosing a 4-Year Bachelor's degree (Honours) may opt to take up a capstone project in their fourth year under the mentor ship of a faculty advisor or an expert from an industry or the relevant area of the project. The primary Purpose of the capstone Project is to demonstrate student's mastery on their subject matter and developing suitable research skills. It helps to develop student mindset to think critically, develop communication skills, induce the feeling and understand the importance of teamwork. This will help them to develop many other life skills that are required to face the real-world problems once they get out of college. Such skills help the students to analyze problems carefully and find solutions to them accordingly. A capstone project can take different forms including research papers, presentations, creative works, business plans, software development, community service project and more. Capstone projects often focus on solving real world problems faced by the organisations or industries. The Specific format and requirement may be depends up on the program and goal of the

project. i.e., it can be either a presentation or a demonstrative film, or a report. Doing a capstone project is highly recommendable and helpful for the honours student who are planning to end their academic career and wish to start their professional career. As the capstone projects demand the long-term involvement of students and require them to take responsibility and stay committed to a certain goal. Completing such projects, which require a great amount of hard work, helps boost confidence and helps to remove the false perceptions they have made towards themselves.

Students choosing a 4-Year Bachelor's degree (Honours with Research) are required to take up research projects/dissertation under the guidance of a recognized research guide. The students are expected to involve in original research .They shall investigate a specific research questions gather data, analysis findings and draw conclusion and submit a detailed report for final evaluation and defense The research outcomes of their project work may be published in peer-reviewed journals or may be presented in conferences /seminars or may be patented.

(VI) Other Activities This component will include participation in activities related to National Service Scheme (NCC), National Cadet Corps (NCC), adult education/literacy initiatives, mentoring school students, and other similar activities.

Remote/blended learning modes:

Options should be made available for students to earn credit by completing quality-assured remote learning modes, including online programmes offered on the Study Webs of Active Learning for Young Aspiring Minds (SWAYAM: www.swayam.gov.in) or other online educational platform approved by the competent body from time to time. Students may opt to earn credits from such courses up to 12 credits required for the award of Degree. Students should be advised to opt for such online/mooc courses which will have a comprehensive graded evaluation with proper grades and grade points. Apart from this students can be allowed to bring relevant credits from other recognized institutions as well as from distance mode of learning.

Task to be assigned to Each Board of Studies

Regarding MDC Courses

- All board of Studies should design and prepare syllabus of one Introductory Paper on that under the MDC (multidisciplinary foundation Course).
- The syllabus of MDC paper of a subject should aim to develop a coherent view of essential concepts, structures, and intellectual methods that characterize the subject
- . The learning outcome of this paper would be to instill broad understanding and an appreciation of the subject. (There will be no practical in the introductory paper).

- This paper will be designed essentially as a prerequisite come discipline specific foundation course for those who wish to peruse a major or minor in that particular discipline.

Things to do for implementing AEC

- All language board of studies including English board of studies should prepare a basket of courses under Ability enhancement course
- Ability Enhancement Courses in english shall be designed specifically to achieve competency in english language with special emphasis on language and communication skills along with critical reading and academic writing skills
- The other language courses shall be designed to enable the students to acquire and demonstrate the core linguistic skills, including critical reading and academic writing skills, expository as well as the cultural and intellectual heritage of the language chosen.
- The Practical Classes for AEC courses may be conducted in the language Lab or in Computer Lab or in Class room depending on the requirement. One batch of students should not exceed half (i.e., 30 or less than 30students) of the number of students in each class/section. 2 Hours of Practical Class is equal to 1 Hour of Teaching, however, whenever it is conducted for the entire class (i.e. for the whole students) 2 Hours of Practical Class is equal to 2 Hours of Teaching.

Things to do for the implementation SEC/VAC Course (Skill Enhancement Course/Value addition courses)

- All board of Studies should design and prepare syllabus for a basket of courses under SEC/VAC
- Skill Enhancement courses are to promote skills in a particular field of study.
- These courses aim to provide students with life skills in the hands-on mode to increase their employability/ Self-employment.
- The objective is to integrate discipline-related skills holistically with general education
- These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.
- The BOS can suggest each institutions to develop its own courses under this category based on its expertise, specialization, requirements, scope and need, which can be offered by that department with the due approval of the Board of studies.

The Vice Chancellors shall constitute expert committees to overcome the crises arising from the absence of formally constituted Boards of Studies in certain fields.

Displace Specific pathway courses:

- Discipline Specific Pathway Courses are the courses designed by each board of studies. These Courses are intend to provide the students with an opportunity to pursue in depth study of a particular subject at different level of proficiency depending up on the level of courses and number of credits earned at different levels .
- The Discipline Specific Pathway courses are arranged at different levels starting from Level 100 which is the foundation level to level 700 above which is the PhD level courses.
- The classification of the level of Pathway courses are described as follows :
- Level 100-199 are : Foundation / introductory courses and Level 200-299 are the Intermediate-level courses
- level 300-399 corresponds to Higher-level courses which are the mandatory level of courses to obtain a major /Additional Major/minor Degrees. and 400-499 Advanced courses which includes the specialization level courses /advanced practicum curses or first yer PG level courses,
- 500-599: Courses at first-year Master's degree level for a 2-year Master's degree programme
- 600-699: Courses at second-year Master's degree level for a 2-year Master's degree programme 700-799 and above Courses limited to doctoral students of that particular discipline.
- The students should move vertically on these pathway and earn certain number of credits in each level to ensure certain level of proficiency.
- If a student wish to choose a discipline pathway for his major then he /she should earn 68 credits from that pathway with a minimum of 8 credits at level 100-199 and 24 credits from level 200-299 and 36 credits from level 300-399 then he / she shall be eligible for a major in that discipline.
- Further if a student earns a minimum of 20 credits at the level 400-499 and if he/she completed successfully a 12 credits project or 3 additional papers equivalent to 12 credits at the level 500 - 599 or above in that discipline pathway then he/she is eligible to get an honors degree in that discipline.
- If a student wish to choose a pathway for his minor specialization then he or she will get a mention of his/her minor pathway if he/she successfully complete 12 credits in that pathway provided out of which at least 4 credit shall be from level 100-199 and 4 credits shall be at level 200-299.
- He/She will get an additional minor degree in that particular discipline if he/ she successfully complete 34 credits in that discipline with at least 8 credits from 100-199 and 8 credits can be at level 200-299 and 12 credits shall be from level 300-399, Rest of the credits he/she can be obtain either from the discipline specific pathway courses /Discipline specific Skill/value addition courses from that discipline.

- He/She will get a second major degree in the second pathway discipline of his/her choice provided he/she should earn 53 credits in that pathway out of which 12-16 credits should be from level 100-199 and minimum 12-14 credit should be from level 200-299 .Rest of the credits should be from level 300-399.
- For PG courses the students should complete 88 credits out which 44 credits shall be at the level of 400-499 or 500-599 and 44 credits shall be at the level of 600-699.
- Each board of studies should carefully design a basket of courses in each level
- Courses at 100-199 level should be designed such a way that any courses chosen from this level will ensure equal horizontal and vertical mobility.
- If a department offers a core and two complimentary papers in earlier CBCS system then the BOS should ensure that the department will offer at least 6 papers at the 100-199 level and 8 papers in the 200-299 level in the present system.
- Each BOS may publish a list of various signature courses (the specialized elective (level 400-499)/skill/value added courses offered by the faculty members of various colleges with the prior approval of the university board of studies
- Each board of studies shall prepare a list online courses at different levels offered in various online educational platforms which can be opted by the students for acquiring credits.
- Board of studies may also prepare a list allied/relevant pathway courses offered by other board of studies that can be considered as pathway course for major/minor for their disciplines at different levels
- Each board of studies should prepare the Content/ provide essential online materials of course and must be made available in the form of e-content on the Learning Management System (LMS) or similar platforms
- Each board of studies should carefully define the Intended Learning Outcomes of each programme and the Generic Skills and knowledge that a Graduates of that particular discipline supposed to demonstrate and the Graduate Attributes of the programmer.
- Each course should be carefully designed with well-defined out comes which can be mapped with the program out comes /graduate attributes.
- BOS should recommend all the available faculty members including the gust faculty in the respective college department to offer courses 16 credits per semester without practical or up to 12 credit or appropriate if practical is involved.
- BOS shall allow students to take credits from vocational /skill courses from the BVoc programs / other degree level vocational programs offered by recognized higher education institution

- Due to the introduction of four year programs there may be a un even distribution of courses/credits for odd or even semesters. Teachers who are taking more credits in odd semester may give equivalent relaxation in even semester and vice versa.
- Depending up on the available work load the BOS may instruct each department of the college to offer more courses.
- A department offering only core subject should offer a minimum of 20 pathway courses to a minimum of 80 credits with in the sanctioned work load, while a department which offers one core and one complementary have to offer a minimum of 23 course with 92 credits at different level during each academic year.
- if more credit hours is available after offering the minimum number of pathway courses/credits then the department should offer at least one MDC course in their discipline with in the available work load.
- If the department is still having available credit hours with in the sanctioned work load after offering the required credit of pathway courses and MDC course then the extra credit hours may be used by the department to offer either the value added courses/Skill courses/ Signature courses as per the requirement of the respective departments
- Board of studies may also allow the respective college departments to recommend certain online/skill courses that can be offered to the students to earn the required credits after obtaining the due approval from the BOS.
- The existing regulations for the programs like Core with complimentary programs, double main programs, honours programs Language reduced programs ,Integrated PG programs and BVoc programs should suitably align with these pathways /curriculum and credit structure.
- For the existing double main programs the double major pathway can be the recommended pathway with an open flexibility to choose any other pathway
- Similarly for the Core with two complimentary programs Major with multiple disciplines of study can be the recommended pathway with an open flexibility to choose any other pathway.
- For the existing LRP programs the Single major with or without minor may be the preferred pathway with an open flexibility to choose any other pathway.
- The existing integrated programs may be redesigned such a way that the students may opt for an exit at third/fourth/fifth year with degree/Honours/PG as per this credit structure. Additional 44 credits may earmarked for the fifth year.
- The existing triple major programme may be either redesigned to a multidisciplinary programme with in those three broad disciplines or a double major programme as per this regulations.

- For BVoc programme the 39 credits for the foundation components may be introduced in line with these regulations by restructuring the general courses. The vocational components may be kept as such and a possibility for awarding a minor degree along the vocational degree may considered by the respective BOS.

Special instruction to the BOS for Courses involved practical

- At present the practical courses are evaluated on an yearly basis. This should be changed and the practical courses also need to be evaluated in every semester.
- Accordingly, the practical courses should be redesigned as one credit course (2hrs) and that should be appropriately clubbed to the respective theory paper so that that particular pathway courses will be off 4 credits with (3C L+1C P).
- At present for complementary papers maximum of 24 experiments are being given to complete and for core papers it is around 68 to 70 experiments.

PART III

Outcome Based Education

INTRODUCTION

As the UGC has made it mandatory for us to follow the system of Choice Based Course (CBC) and Outcome Based Education (OBE), our UG courses with fairly well updated contents have been under choice-based credit and semester system. Although their overall standard is quite good, their structure, composition, procedures and credit administration are not yet according to the CBS system, because they are not courses but annual papers divided into two for a semester. Courses are well designed instruction packages in specific knowledge fields, with preconceived results that go into the making of the outcome of the Academic Programme. They are scientifically structured with insights of continuity, sequence, and integration, appropriate for effective learning.

Designing a Course is part of the science of teaching and learning. It is integral to OBE that insists upon determination of learning outcome as the first step. Precisely drawn outcomes of a Course provide clarity of purpose in teaching/learning. They act as a running thread of quality control across the planning of curriculum, selection of instructional strategies, choice of learning experience, and preparation of tests. Informing learners about the outcome well in advance, OBE enables ongoing concurrent self-assessment of learners for making sure of their progress towards attaining the outcome. It provides them with chances to demand new learning experiences that ensure the same. Since the outcomes are stated, the teachers also get to know the progress and they enjoy the legitimate right to test whether the learners have attained the goal (N.J. Rao, 2023).

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- Program Outcomes (PO) which give a description of the qualities, skills, abilities and understandings, that an institutional community agrees as its students should develop as a consequence of the learning they engage with the program of study in that institution. POs indicate

what students are expected to know and be able to do by the time they graduate from the institution. POs are not directly connected to any specific academic disciplines.

- Programme Specific Outcomes (PSO) or Program Educational Outcomes (PEO) are the broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve what students are able to perform after the completion of the program.
- Course Outcomes (CO) are the measurable parameters which evaluate each student's performance in Blooms taxonomy levels for each course that the student undertakes in every semester.

Accordingly, every programme of study lends itself to well-structured and sequenced acquisition of knowledge and skills. Practical skills, including an appreciation of the link between theory and practice, will constitute an important aspect of the teaching-learning process. Teaching methods, guided by such a framework, may include lectures supported by group tutorial work; practicum and field-based learning; the use of prescribed textbooks and e-learning resources and other self-study materials; field- based learning/project, open-ended project work, some of which may be team-based; activities designed to promote the development of generic/transferable and subject- specific skills; and internship and visits to field sites, and industrial or other research facilities etc.

In the new Curriculum Framework Teaching assumes different dimensions distinguished from what has been common, thanks to digital technologies. Conversion of Classroom Teaching into Active Learning through techno-pedagogy that enables students' effortless involvement and comprehension quicker. With learning becoming central in higher education, teaching shall be scholarly and confined to rendering theories accessible to learners. Theories shall be taught through concrete examples from real life situations in order helping learners understand the applied context. Naturally, teaching shall be deeper engagement with latest trends, new interpretations, research findings, discoveries, and inventions demonstrating the depth the learners should strive to fathom. Teaching oriented to questions and clarifications, shall be inevitably interactive.

Overall, the present UG curriculum framework serves as a blueprint for designing, implementing, and evaluating undergraduate educational programs, with the ultimate goal of providing students with a well-rounded, rigorous, and enriching educational experience. It takes into account both the specific requirements of a chosen major and the broader educational goals of the institution.

Fundamentally, all courses of an undergraduate programmes shall primarily to showcase their:

- Learning Outcomes: The curriculum framework begins with clear and measurable learning outcomes or objectives. These outcomes define what students should know, understand, and be able to do by the time they complete their undergraduate studies. Learning outcomes serve as the foundation for designing the curriculum.

- Core Competencies: A UG curriculum framework typically includes a set of core competencies or skills that students should develop during their undergraduate education. These competencies often encompass critical thinking, communication, problem-solving, and discipline-specific skills.
- Curriculum Structure: The framework outlines the overall structure of the curriculum, including the sequence of courses, credit requirements, and any prerequisites or co-requisites. It may also specify the distribution of courses across general education, major, and elective categories.
- Assessment and Evaluation: It is essential to include mechanisms for assessing student progress and evaluating the effectiveness of the curriculum. This may involve the use of assignments, exams, projects, and other assessment tools.
- Continuous Improvement: A UG curriculum framework should be adaptable and subject to periodic review and revision to ensure that it remains current and aligned with the evolving needs of students and society.
- Alignment with Institutional Goals: The curriculum framework should align with the broader mission and goals of the educational institution, reflecting its commitment to providing a well-rounded and quality education.
- Student Support Services: Consideration of student support services, such as advising, counseling, and career services, is important to ensure that students have the resources they need to succeed within the framework.
- Diversity and Inclusion: The framework may incorporate principles of diversity and inclusion to ensure that the curriculum reflects a diverse range of perspectives and experiences.
- Ethical and Professional Development: Some UG curriculum frameworks emphasize the development of ethical and professional values, encouraging students to become responsible and engaged citizens.

UNDERSTAND YOUR PRESENT CURRICULUM

It is imperative to conduct a comprehensive analysis of the existing undergraduate (UG) curriculum of your specific programmes, which forms a critical first step in the curriculum redesign process. This analysis provides a deep understanding of the current state of the curriculum and identifies areas in need of improvement. Conducting a comprehensive analysis of the existing UG curriculum is a thorough and data-driven process. It serves as the foundation for informed decision-making during the curriculum redesign effort, enabling institutions to create a curriculum that is aligned with program goals, student needs, and industry demands.

- Gather Curriculum Documents: Collect all relevant curriculum documents, including course syllabi, program guides, learning objectives, course materials, and assessment rubrics.

- Assemble the Team: Form a team comprising faculty members, curriculum experts, and stakeholders to collaborate on the analysis.
- Define Objectives and Scope: Clearly outline the analysis objectives and scope, specifying whether it covers the entire program or specific courses and majors.
- Review Learning Outcomes: Examine the stated learning objectives and outcomes for clarity, measurability, and alignment with program goals.
- Assess Content: Analyse course content for relevance, currency, and coverage. Consider if it aligns with program objectives.
- Evaluate Assessment Methods: Review assessment methods used in courses to ensure alignment with learning outcomes. Assess the variety and effectiveness of assessment tools.
- Examine Pedagogy: Evaluate pedagogical approaches for their support of active learning, critical thinking, and student engagement. Consider technology integration and innovative teaching methods.
- Check Course Sequencing: Evaluate course sequencing for logical progression and alignment with program objectives, checking for prerequisites and co-requisites.
- Gather Stakeholder Input: Collect input from stakeholders such as students, faculty, alumni, industry partners, and accrediting bodies through surveys, interviews, or focus groups.
- Analyse Data: Examine data on student performance, retention rates, and course completion. Identify trends or patterns indicating areas of concern.
- Conduct Gap Analysis: Identify discrepancies between learning outcomes and assessment results, pinpointing areas where the curriculum may fall short.
- Meet Accreditation Requirements: Ensure curriculum alignment with accreditation standards and address non-compliance issues.
- Benchmark Curriculum: Compare the curriculum to peer institutions or industry standards, identifying best practices and areas for improvement.
- Perform SWOT Analysis: Conduct a SWOT analysis to summarize curriculum strengths, weaknesses, opportunities, and threats.
- Compile a Report: Summarize findings in a comprehensive report and provide clear recommendations for improvement, including specific actions and responsible parties.
- Seek Feedback: Share the report with stakeholders and validate findings through discussions and input.
- Create an Action Plan: Develop a detailed action plan outlining how to address identified issues during the curriculum redesign process, setting timelines and responsibilities.
- Implement Continuous Monitoring: Establish a system for ongoing curriculum monitoring and evaluation to ensure sustained improvement.

NEED ASSESSMENT

Before entering in to the actual process of redesigning the curriculum and courses, conducting a needs assessment is a proactive and strategic approach to curriculum design and improvement. It helps educational institutions stay relevant, responsive, and effective in meeting the evolving needs of students, industries, and the broader educational landscape. It has wider implications, especially,

- Alignment with Stakeholders' Expectations: Identifying and understanding the expectations of various stakeholders, including students, faculty, alumni, industry partners, and accrediting bodies, job enablers that helps ensure that the curriculum remains relevant and responsive to their needs. This alignment enhances overall program outcomes and effectiveness.
- Meeting Industry Demands: As industries and workplaces evolve, so do their skill and knowledge requirements. A needs assessment helps in identifying current and future industry trends, skills gaps, and job market demands. This information allows UG programs to adapt and equip students with the skills and knowledge that are in demand, increasing graduates' employability.
- Adapting to Changing Educational Landscape: The educational landscape is constantly changing due to advancements in pedagogy, technology, and learning methods. A needs assessment helps educational institutions stay abreast of these changes, ensuring that their curricula remain up-to-date and aligned with best practices in education.
- Enhancing Program Relevance: By conducting a needs assessment, institutions can identify areas within the curriculum that may have become outdated or irrelevant. This information enables them to make necessary adjustments, add new courses, or eliminate outdated content to keep the program fresh and meaningful.
- Meeting Accreditation Requirements: Accreditation bodies often require evidence of ongoing assessment and responsiveness to stakeholder needs. Conducting a needs assessment provides the data and documentation necessary to demonstrate compliance with institutional accreditation standards or programme accreditation standards as per the requirements.
- Improving Student Engagement and Retention: A curriculum that aligns with students' expectations and industry trends is more likely to engage students and retain them throughout their educational journey. Meeting students' needs can lead to higher satisfaction and better educational outcomes.
- Enhancing Institutional Reputation: UG programs that are known for staying current and meeting stakeholders' expectations tend to have a stronger reputation in the academic and professional communities. This can attract more students and better faculty, contributing to the institution's overall success.
- Efficient Resource Allocation: By identifying specific needs and priorities through a needs assessment, institutions and respective departments can allocate resources more efficiently. This includes faculty development, technology investments, curriculum updates, and other investments aimed at improving the program.

- Promoting Continuous Improvement: A needs assessment is not a one-time effort but part of an ongoing process of continuous improvement. Regularly assessing needs and expectations ensures that the curriculum remains responsive and adaptable in an ever-changing educational environment.

DEFINE YOUR LEARNING OUTCOMES

Defining learning outcomes based on Outcome-Based Education (OBE) standards is a structured and systematic process that focuses on specifying what students should know and be able to do by the end of a course or program. OBE emphasizes the importance of clearly defined and measurable learning outcomes. The new curricular framework of UG programme has stated the need of adopting OBE in Course designing strategy. Three levels of Outcomes set for individual programmes necessitate the proper structuring and alignment of various components like:

- Understand the Philosophy of OBE: Familiarize yourself with the fundamental principles and philosophy of Outcome-Based Education. This includes a focus on student learning, alignment with program goals, and the importance of clear, measurable outcomes. The KSHEC has published various documents pertaining to the implementation of OBE in UG as well as PG Programmes. The comprehensive handbook on OBE published by the Council is highly beneficial to the group to pursue the designing as well as assessment strategies.
- Identify the Program or Course: Determine a mechanism through which you identify the programme Outcomes in alignment with the Institutional PO applicable to all programmes and also the PSO for your specific programmes. In addition to it, allocate the task of defining Course Outcomes (CO) for specific courses to respective faculty experts. The scope will influence the level of detail and specificity in your outcomes.
- Collaborate with Stakeholders: Engage with relevant stakeholders, including faculty members, students, industry experts, and accrediting bodies. Their input and perspectives are valuable for defining meaningful learning outcomes. It is also most important to engage with scholars and subject experts of prestigious Institutions of excellence in connection with your specific areas of knowledge.
- Define Program or Course Objectives: Clearly articulate the overarching goals and objectives of the program or course. Objectives are to be defined in the context of teacher or Institutional perspective. It should explain the overall nature and prospects of the programme or courses. There shall be a fixed or flexible number of Programme Outcomes (PO) Course Outcomes (CO) to be restricted by the respective committees. It shall be in consensus at the Institutional level.
- Consider Bloom's Taxonomy: A learning taxonomy is inevitable to express the learning outcomes of programme Specific and Course level. It is appropriate to utilise Bloom's Revised Taxonomy (2001) or a similar framework to guide the level of cognitive and skill development you want to target in your outcomes. This framework includes categories such as remember, understand, apply, analyse, evaluate, create and its sub process.

- Use Action Verbs: It is essential to start the outcome statement at course levels as well as the assessment tools with appropriate & specific action verbs or corresponding sub process verbs that describe observable and measurable behaviours of an outcome statement. Refer various connected documents published by KSHEC in this regard.
- Specific and Measurable: Ensure that each learning outcome is specific and measurable. Avoid vague or ambiguous language. Learning outcomes should clearly state what students will know or be able to do. This detailed strategy is adequately mentioned n the handbooks published by the Council.
- Focus on Desired Competencies: The curriculum committee shall define the outcomes that reflect the competencies and skills students need to succeed in their chosen field based on the requirements. Consider both disciplinary knowledge and broader skills such as critical thinking, problem-solving, and communication etc. Classroom activities, field activities and lab activities have to be clearly defined and expressed with possible examples can be included in the course redesigning.
- Align with Program Goals: Ensure that each learning outcome of the courses that aligns directly with the program or course objectives you identified earlier. There should be a clear connection between the program's overarching outcomes and individual course outcomes.
- Prioritize and Sequence: It is essential to sequence and prioritise the Course components like Modules/Units or COs as per the relevance and context of the specific Course. If defining outcomes for a program or a series of courses, prioritize them and consider their sequence. Learning outcomes should build on each other to create a coherent and progressive learning experience.
- Document and Communicate: Document the learning outcomes in a clear and accessible format. Communicate them to faculty, students, and other stakeholders, emphasizing their importance in guiding teaching and assessment. Thorough scrutiny of the redesigned course among peer investigators for accuracy and rectification of any errors if any.
- Assess and Revise Continuously: UGC also has prescribed to revise the existing curriculum within an interval of 3 to 5 years of time. Use the defined learning outcomes as a basis for assessment and evaluation. Continuously gather data on student performance and use this information to refine and improve the outcomes and the curriculum as a whole.
- Align with Assessment Methods: It is to ensure that all COs should align with the assessment methods, including exams, assignments, and projects, align with the defined learning outcomes. The assessment tools must be prepared using the predefined rubrics. Course shall contain the strategy of adopting appropriate rubrics for formative and summative examinations. This alignment helps in measuring student achievement accurately.

- Attainment of Learning Outcomes: It is the measure of how well students have acquired and demonstrated the intended learning outcomes. There are various methods for attainment through direct and indirect methods provided in the handbook published by the Council. This will provide a strategy for evaluating student progress and achievement in a very continuous and cyclic manner.

Taxonomy of Learning

The taxonomy suggested this document for stating the outcomes & assessment tools are based on the Bloom's Revised Taxonomy 2001 (Anderson & Krathwohl, 2001). Many workers have pointed out the relevance of this model in OBE both in school education as well as in higher education.

Widely used in the curriculum development, student and teacher assessment, accreditation of institutions providing education, and so on, Blooms' taxonomy heralded a transformation in the conduct of education in the twentieth century by offering a scheme for classifying educational goals, objectives and standards. He also explains that the purposes of developing a taxonomy of educational objectives in 1956 included: (a) to develop a common language about the learning goal to facilitate communication across persons, subject matter and grade levels; (b) to serve development of national, state and local standards in education; (c) to develop an acceptable assessment scheme for a unit, course, or curriculum; and (d) to expose the range of educational possibilities against which the limited breadth and depth of any particular educational course or curriculum could be contrasted (Krathwohl, 2002).

Bloom's taxonomy has been revisited several times by educational psychologists, and several variants of the original taxonomy were proposed. L. W. Anderson, D.R. Krathwohl, and others presented a revision of Bloom's taxonomy of educational objectives in 2001 to re-establish the relevance of the ideas in Handbook (1956) and to incorporate new knowledge and thought produced since 1956. The revised Bloom's Taxonomy of cognitive domain was two-dimensional in contrast to the single dimension of the original taxonomy. The suggested two dimensions are cognitive process and knowledge. The cognitive process dimension contains six categories: Remember, Understand, Apply, Analyse, Evaluate, and Create. These cognitive processes are organized hierarchically as per cognitive complexity. For example, the process Apply is at higher cognitive complexity than Understand, which means Apply cognitive activities are likely to involve cognitive activities belonging to Understand and Remember cognitive levels. The knowledge dimension contains four categories: Factual, Conceptual, Procedural, and Metacognitive. The two-dimensional nature of the Revised Taxonomy allows a more natural expression of an outcome statement.

Cognitive Processes

Cognitive processes are attention, perception, comprehension, calculation, judgment, storing in memory, reasoning, retrieval from memory, learning, planning, problem-solving, self-monitoring, and speech formation. Knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing, and synthesizing data, applying knowledge, choosing among alternatives in problem-solving, and evaluating ideas or actions demonstrate cognitive learning. This domain on the acquisition and use of

knowledge is predominant in most courses. As per the revised Bloom's taxonomy, the taxonomy of cognitive processes involved in learning are

- Remember
- Understand
- Apply
- Analyse
- Evaluate
- Create

Knowledge Categories

There are several subprocesses associated with each one of these cognitive processes. The four categories of knowledge considered by the Revised Bloom taxonomy are

- Factual
- Conceptual
- Procedural
- Metacognitive

One must use the words representing the six categories of cognitive processes with specific meanings defined by Bloom. The concept used in the exercises given in this handbook for framing the Course Outcomes and the Questions from the respective Course Outcomes is Bloom's Revised Taxonomy.

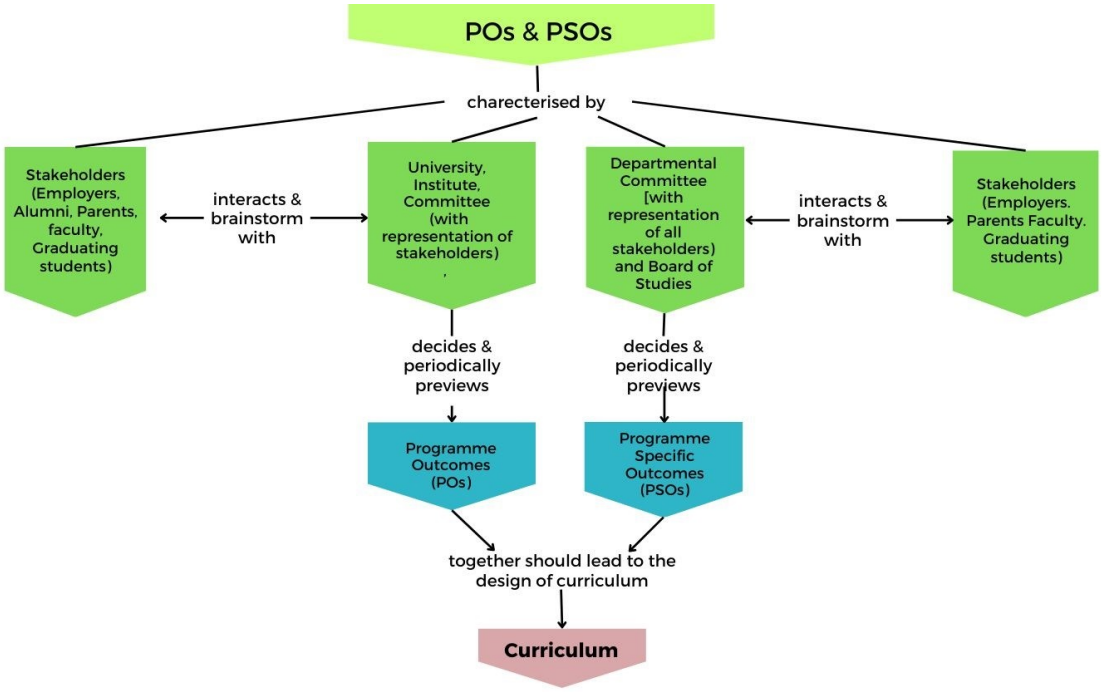
The revised taxonomy of 2001, authored by Anderson and Krathwohl, who are the primary authors of the revisions to what had become known as Bloom's Taxonomy — an ordering of cognitive skills. This original taxonomy of Benjamin Bloom had permeated teaching and instructional planning for almost 50 years before it was revised in 2001. And although these crucial revisions were published in 2001, surprisingly there are still educators who have never heard of Anderson and Krathwohl or their important work in relation to Bloom's Cognitive Taxonomy.

LEVELS OF OUTCOMES

Outcomes are the abilities the students acquire and demonstrate at the end of a learning experience. The learning experience can be an instructional unit that involves a small number of hours of instructional activity, a course of one-semester duration, or a two to four-year formal undergraduate program. Outcomes serve as the basis for productive interaction among concerned stakeholders. The outcome can also be called a 'learning product' since the outcome is the product of learning. Therefore, the "product defines the process" in OBE. It is results-oriented thinking and is the opposite of input-based education, where the emphasis is on the educational process and where we are happy to accept whatever is the result. Outcome-based education is not merely producing outcomes for an existing curriculum.

Outcomes can be defined at two levels in the case of General undergraduate programs.

- Program Outcomes: POs (Program Outcomes) are statements that describe what the students graduating from general programs should be able to do.
- Program Specific Outcomes: PSOs (Program Specific Outcomes) are statements that describe what the graduates of a specific program should be able to do.
- Course Outcomes: COs (Course Outcomes) are statements that describe what students should do at the end of a course.



Source:(Rao & Banerjee, 2023).

PROGRAMME OUTCOMES

The general undergraduate degree is the terminal degree for most graduates (>80%). They get into employment not necessarily related directly to the discipline of the program they graduated from. Whatever be the profession the graduates get into, they need to have some abilities and attitudes that make them good employees and contribute to the wealth generation and service activities of the organization they work for. In any organization, the employees must work as teams arranged in some hierarchy, communicate well in verbal and written form with peers and customers, understand the impact of what they do on society, etc. Program Outcomes (POs) represent the knowledge, skills, and attitudes that all students are required to attain at the time of graduation from any program. POs need to be identified by the University/Institute offering general programs. POs are non-specific to the discipline of the program. Sometimes these are referred to as liberal education and common core competencies. Some sample POs are:

PO1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2.Problem Solving: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired from humanities/ sciences/ mathematics/ social sciences.

PO 3. Computational Thinking: Understand data-based reasoning through translation of data into abstract concepts using computing technology-based tools

PO4.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO5.Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings

PO6.Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO7.Global Perspective: Understand the economic, social and ecological connections that link the world's nations and people.

PO8.Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO9. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO10. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

The following sample exercise will help the members to identify the POs according to priority and need of the respective programme. It may be remembered that the POs have to be finalised by the /autonomous University level.

EXCERSICE-I

In the present context, Program Outcomes (POs) indicate the graduate attributes every student graduating from a UG program should attain. That includes the generic knowledge, skills and attitudes etc. While every course of the program can address only one or a few subset of POs, all the courses together should be able to address all the POs.

All the UG students would have worked to attain all the POs of UG programs. **The number of POs of PG programs may be restricted to 3 to 4 for a better implementation.**

In this exercise each faculty member can choose ideally 3 or 4 of the POs indicated below and reword/or substitute them if necessary, keeping the Vision and Mission of your Institution. The collective selection of

all POs by all individual faculty members can be appropriately chosen for the final Programme Outcomes (Graduate Attributes) of the institution through a consensus among various Board of Studies.

Name of the University/Institution:

Name of the Program:

Faculty Member:

PO	PO Statement	Selected/ Not Selected
PO1	Critical Thinking:	
PO2	Problem Solving:	
PO3	Communication:	
PO4	Responsible Citizenship:	
PO5	Ethics:	
PO6	Self-directed and Life-long Learning:	
PO7	Computational Thinking:	
PO8	Social Interaction:	
PO9	Environment and Sustainability:	
P10	Global Perspective:	

PROGRAMME SPECIFIC OUTCOMES

Program Specific Outcomes (PSOs) are outcomes that are specific to a program. They characterize the specificity of the core (core courses) of a program. PSOs of a general program can only be two to four in number. PSOs are a subset of learning outcomes that are specifically tailored to a particular academic program or discipline within a higher education institution. These outcomes are designed to reflect the unique goals and objectives of a program and are typically more specialized than broader institutional learning outcomes. PSOs provide a clear picture of what students are expected to achieve upon completing a specific program of study.

Sample PSOs for BSc (Zoology) are

PSO1. Understand the nature and basic concepts of cell biology, Biochemistry, Taxonomy, and ecology.

PSO2. Analyse the relationships among animals, plants, and microbes

PSO3. Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Taxonomy, Economic Zoology, and Ecology

PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture, and Medicine

While POs to chosen as an Institutional perspective irrespective of disciplines, the PSOs need to be written by the concerned Board of Studies as discipline specific. They provide a clear roadmap for program development and help ensure that graduates are well-prepared with the skills and knowledge needed for success in their chosen field of study. The PSOs are applicable to the core courses only. It represents the concise information about the overall outcome of the specific programme chosen by the student who will acquire by the end of the programme. Hence for the Foundation Courses, framing or stating the PSO is not necessary. This section provides only a sample of exercise which will help to design a couple of PSOs for any programme of study.

EXCERSICE-II

Program Specific Outcomes

PSOs are specific to a program and are to be attained at the time of graduation from the program. They characterize the specificity of the core (core courses) of a program. PSOs of a general program can only be two to four in number. All programs should be designed and conducted to attain the POs identified by the University and PSOs identified by the concerned Boards of Studies. They are to be identified by a **committee with representation from all stakeholders**.

- The PSO statement should start with one or more action verbs.
- The action verbs should be followed by clearly identified knowledge, skills and attitudes, and if required by the conditions under which the actions have to be performed.
- Some examples of action verbs
- Formulate, specify, conceive, design, plan, architect, build, implement, test, operate, perform, understand
- Select
- Analyse, determine, estimate, calculate

Program:

Faculty Members:

PSO	PSO Statement
PSO1	
PSO2	
PSO3	
PSO4	

Some sample PSOs prepared by groups of faculty members from different branches are given below. It is not necessary to take them as standard. It is the Boards of Studies that need to rewrite the PSOs whenever the curriculum is reviewed and changed.

BSc Zoology

PSO1. Understand the nature and basic concepts of cell biology, Biochemistry, Taxonomy, and ecology.

PSO2. Analyse the relationships among animals, plants, and microbes

PSO3. Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Taxonomy, Economic Zoology, and Ecology

PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture, and Medicine.

BSc in Chemistry

PSO1. Understand basic principles of Organic, Physical, and Inorganic Chemistry.

PSO2. Identify and estimate the components of organic and inorganic chemicals and determine the physical properties of compounds.

PSO3. Synthesize specified chemicals, characterize them, and interpret spectral data to elucidate the structure of the synthesized chemical compound.

PSO4. Solve problems in thermodynamics, electrochemistry, analytical chemistry, spectroscopy, and photochemistry.

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[1]Additional samples of PSOs are available online:

COURSE OUTCOMES

Course Outcomes (COs) represent what the students should be able to at the end of a course. They will be discipline and subject specific. They are specific learning goals that are defined for individual courses within an academic program. These outcomes outline what students are expected to know or be able to do upon completing a particular course. Course Outcomes are essential for guiding instruction, assessment, and curriculum development at the course level.

Some sample COs from different courses are:

- Understand human development aspects, including pregnancy, parturition, birth control, infertility, developmental defects, and miscarriage.
- Synthesize specified chemicals, characterize them, and interpret spectral data to elucidate the structure of a synthesized chemical compound.

[1] *https://padlet.com/manulalgeo/programme-specific-outcomes-psos-cwsavjyruf90r7wh*

- Write programs for one-dimensional and two-dimensional array manipulation and string handling functions

Course Outcomes are to be written by the teacher(s) offering the course or the Board of Studies of the concerned program. They ensure that each course contributes to the overall educational goals of the program and provides a clear roadmap for instructors and students to follow.

A course in a General Higher Education program in India needs to be designed and conducted to facilitate the students to meet the identified Course Outcomes. The Course Outcomes address a subset of Program Outcomes identified by the University or the Autonomous Institute that offers the Program. Also, the Course Outcomes address Program Specific Outcomes identified by the Branch/Department. The three-day workshop aims at facilitating the participants to write Course Outcomes of courses of their choice and Program Specific Outcomes in OBE-CBCS of UGC and NAAC Accreditation frameworks.

Graduates of all UG and PG Programs in India are required to attain the Program Outcomes (POs) identified by the University/College and Program Specific Outcomes (PSOs) identified by the University or the Department offering the Program.

• POs and PSOs are to be attained through courses, projects, and co-curricular and extra-curricular activities in which performance of the students is evaluated.

• In the new FYUG framework, Courses are broadly classified into Discipline-Specific C (DSC) (major or minor), Discipline Specific Electives (DSE), Multi-disciplinary Courses (MDC), Ability Enhancement Courses (AEC), and Skill Enhancement Courses (SEC).

POs and PSOs are to be attained through core courses, ability enhancement courses, and activities in which all students participate. Courses constitute the dominant part of any program.

Under the present CBCS (Choice Based Credit System) the courses can be of 3:0:0, 3:0:1, 3:1:0. 4:0:0, 2:0:0, 2:0:1, 2:0:2, 0:0:1, 1:0:2 or 1:0:1credits.

Credit

One Credit is defined as

• One hour of classroom interaction per week over a semester

• One hour of tutorial per week over a semester

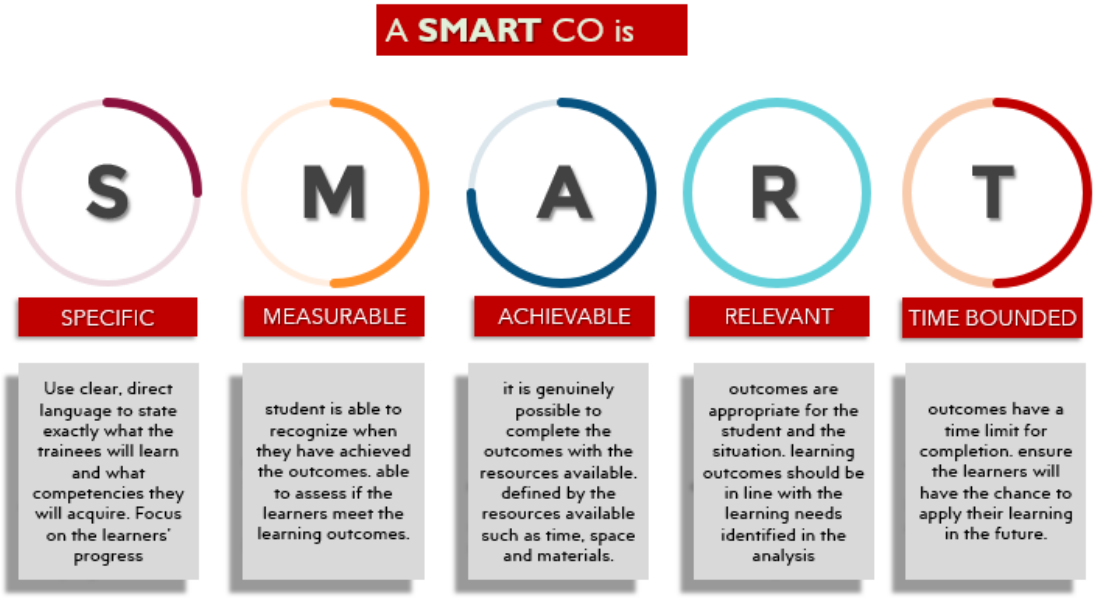
• Two hours of laboratory/field work per week over a semester

Course Components as per FYUGP are:

- (1) Lecture (L): Courses involving lectures
- (2) Tutorial (T): Courses involving problem-solving and discussions

- (3) Practicum or Laboratory (P): Course requiring students to participate in a project or practical or lab act Seminar: Course requiring structured discussion/conversation or debate focused on assigned tasks Internship: Course requiring actual work situations. Internships involve working with local industry, government etc. Studio activities: creativity artistic activities Field practice/projects: Learning in field Community engagement and service: expose students to the socio-economic issues in society.

While framing the COs, the BoS has to consider various relevant aspects that are essential to facilitate the effective transaction of the curriculum and the attainment of such COs they finalized. This can be given in the form of SMART, which represents S=Specific, M=measurable, A=Achievable, R=Relevant, T=Time bound, so that each CO must meet these key points.



EXCERSICE-III

Write Course Outcomes (6±2) for courses having credits 3:0:0 or 3:1:0 or 3:0:1, and 8±2 for courses with 5 or 6 credits) of a course you taught or are familiar with, paying attention to all the Do's and Don'ts, making sure all the items in check list are checked out.

Dos and Don'ts

- Use only one action verb (two if absolutely necessary).
- Do not use words including 'like', 'various', 'such as', 'different', 'etc.'

with respect to knowledge elements. Enumerate all the knowledge elements.

- Put in effort to make the CO statement as detailed as possible and measurable.
- Do not make it either too abstract or too specific.

Check List

1. Does the CO begin with an action verb (e.g., state, define, explain, calculate, determine, identify, select, design etc.)?

2. Is the CO stated in terms of student performance (rather than teacher performance or subject matter to be covered)?
3. Is the CO stated as a learning product (rather than in terms of the learning process)?
4. Is the CO stated at the proper level of generality and relatively independent of other COs (i.e., is it clear, concise, and readily definable)?
5. Is the CO attainable (do they take into account students' background, prerequisites, facilities, time available and so on)?

Mention Name of Course:

Credits given: [L:T:P]

CO No.	CO Statement
CO1	
CO2	
CO3	
CO4	
CO5	
CO6	
CO7	
CO8	

Preparation of Assessment Tools

Question bank and pool is a vast repository of assessment items to be prepared in connection with the implementation OBE. Institutions can make a serious drive to frame questions of different learning levels particularly as per the standard of the learning taxonomy adopted. This will become an important resource for institutions. This can be done collectively using existing faculty and experts from outside. The quality and standards of the questions and other assessment tools must be prepared using appropriate rubrics for the corresponding item. Similarly, there shall be an effective mechanism to monitor and ensure the quality of assessments tools designed for this purpose in a time bound manner. It has to ensure that all faculty of every institution are participated in this process.

1. Assessment Process and Evaluation

   The conduct of examination and other assessment activities as part of internal and end semester examinations can be framed under the OBE pattern. The question bank prepared can be effectively utilised with adequate mechanism for error free conduct of examination. The examination scheme must be accordingly modified by adding the level of learning outcome to be conveyed through the assessment items prepared by the faculty, to the learner student and to the examiners.

A complete alignment of the curriculum, instructional methods in classrooms, learning by students, assessment process and finally to correct the gap in the achievement of attainment levels etc. must be ensured in this process.

2. Bridging the Gap of attainment levels

   Finally, the attainment of the learning outcome must be detected as whether these outcomes are properly attained using effective computation methods by the faculty with the help of the software developed. The corrective steps shall also be taken for rectifying the gaps and shortfalls in the attainment levels of students if the expectation is not met. Proper feedback mechanism from students, teachers, parents etc must be introduced. For this purpose, evaluation of attainment by students can be checked by outsourcing the same to agencies also.

EXCERSICE-IV

This exercise template can be used for individual faculty members for writing down Bloom's Revised Taxonomy based questions of 6 cognitive process on hierarchical order. One can frame questions starting from *Remember* level to *Create* level based on a single topic or different topic based on a course familiar to them or routinely taught by them.

Cognitive Activities: Examples of questions/activity of different cognitive levels

The cognitive domain deals with a person's ability to process and utilize information in a meaningful way. Give at least one example of activity (or question) at all the six cognitive levels including Remember, Understand, Apply, Analyse, Evaluate and Create related to the courses you are teaching or taught. It is better to take any most familiar course and a single area of instruction which may have all the 6 cognitive process levels to address the activity/question.

Cognitive Level	Activity/Activities/Questions
Remember	
Understand	
Apply	
Analyse	
Evaluate	
Create	

EXCERSICE-V

Tagging of Course Outcomes with Pos and PSOs

Tag the Course Outcomes written in the Exercise 4 with the POs and PSOs addressed, Cognitive Level, Knowledge Categories, the number of Class Sessions, and the number of Laboratory Hours if applicable.

Mention Name of Course:

Mention Credits:

CO	CO Statement	PO/ PSO	CL	KC	Class Hrs	Lab Hrs
CO1						
CO2						
CO3						
CO4						
CO5						
CO6						
CO7						
CO8						
	Total Number of Hours					

PART IV

Concept of Redesigning of Courses

INTRODUCTION

Designing a new course involves several essential components and titles that provide structure and clarity to the course. While specific titles and components may vary depending on the institution and field of study, the following fundamental elements shall not be excluded. The primary aspect is that the redesigning is intended to be done using the OBE framework. The Courses shall be framed with clarity in presenting the outcomes.

The process of redesigning a course involves a methodical approach that considers numerous factors. The following steps will show you how to redesign a course:

- Firstly, Identify the Purpose and Goals: After giving a brief overview or outline of the Courses, Clarify the objectives of it. It requires the intended learning outcomes. Specify what knowledge, skills, and attitudes students should acquire by the end of the course.
- Define the Course Structure: Determine the overall course structure, including the sequence of topics, modules, or units in terms of Course Outcomes.
- Establish Course Outcomes: Clearly define specific, measurable, achievable, relevant, and time-bound (SMART) learning outcomes for each module or topic. Ensure that the objectives align with the course goals and reflect the desired learning outcomes.
- Revise and Develop Content: Review the existing course content and revise it based on the needs assessment and learning outcomes. Update outdated information, incorporate current research and industry practices, and consider diverse perspectives. Develop new content as needed, including readings, multimedia resources, case studies, and real-world examples.
- Choose Instructional Strategies: Identify Classroom, Filed, and lab activities. Select instructional strategies that align with the learning objectives and engage students. Consider a mix of approaches such as lectures, discussions, group work, hands-on activities, simulations, and multimedia presentations. Incorporate active learning techniques to encourage student participation and critical thinking.

- Adopt Technology: Identify appropriate technologies to enhance the learning experience and achieve instructional goals. Explore learning management systems, online collaboration tools, multimedia resources, interactive simulations, and virtual labs. Ensure that the chosen technologies are accessible and user-friendly for all students.
- Design Assessments with appropriate rubrics: Determine the assessment methods and tools to evaluate student learning. Develop a variety of assessments aligned with the learning objectives, including quizzes, exams, projects, presentations, papers, and peer evaluations. Consider formative assessments that provide ongoing feedback and opportunities for improvement.
- Feedback and Reflection: There shall also be the components of Feedback and Reflection from Students, alumni of the course. Create opportunities for students to provide feedback on the course and their learning experiences.
- Continuous Improvement: Use the data and feedback gathered from the evaluation stage to inform future iterations of the course. Apply the lessons learned to refine the course design, content, and delivery methods for subsequent offerings. Embrace a culture of continuous improvement to ensure ongoing enhancement of the course.

COMPONENTS OF A COURSE

The features included in a specific course will collectively provide students with a comprehensive understanding of the course and its requirements, helping them succeed academically. Course instructors and program coordinators work together to ensure that courses align with program goals and contribute to students' overall educational experience.

It is desirable that the following components may be included in the Course Syllabus:

1.Course Title

The course title should clearly and concisely reflect the content and focus of the course. The title of a course typically provides a brief and descriptive name for the course, indicating its subject matter or focus. It serves as a way for students and potential participants to quickly understand what the course is about. Course titles are designed to be informative and concise.

2.Course Overview/Description

A brief description (usually a paragraph or two) that provides an overview of the course's content, objectives, and intended audience. It should help students understand the course's relevance and purpose.

3.Course Number and Credits

The course number and the number of credit hours it carries. This information is essential for registration and credit calculation. It shall be provided in the format of L:T:P (Lecture:Tutorial:Practical). The total LTP must provide the total credit of the Course.

4.Prerequisites

Any prerequisite courses or knowledge that students are required to have before enrolling in the course. Prerequisites ensure that students have the necessary background to succeed in the course.

5.Instructor Information:

The name and contact information of the instructor or instructors responsible for teaching the course. There shall be space provided to give this information.

6.Course Contents/Course Objectives (Units/Modules)

A detailed breakdown of the course content in the form of Module or Units can be provided, including topics, themes, or units that will be covered. This provides an overview of the course's structure. The Course Outcomes (CO) need not be necessarily to correspond the respective Modules/Units. It is but desirable if the corresponding CO statements are provided for each module.

7.Course Outcomes

Clearly defined learning objectives that outline what students are expected to achieve by the end of the course. Objectives should be specific, measurable, achievable, relevant, and time-bound (SMART).

8.Required Textbooks and Materials

A list of required textbooks, articles, readings, software, or other materials that students need for the course. Information about additional resources, such as recommended readings, websites, or tutorials that can enhance student learning and understanding of the course material.

9.Assessment Methods

A description of the assessment methods that will be used to evaluate student learning. This may include details on exams, quizzes, assignments, projects, presentations, and grading criteria. Appropriate rubrics for each assessment tool must be defined in this part.

Information on how students will be evaluated and graded, including grading scales, rubrics, and policies for late assignments or missed exams.

10.Course Schedule and Timeline:

A schedule that outlines the sequence of topics, assignments, exams, and due dates throughout the course. It helps students plan their work and stay organized.

11.Course Format and Delivery:

Details about how the course will be delivered, whether in-person, online, or in a hybrid format. Include information on class meetings, discussion forums, and any technology or platforms used. The percentage of online/offline mode for teaching as well as assessment must be defined in this section.

12.Course Policies

This part shall contain clear policies related to attendance, participation, late submissions, academic integrity, and any other important guidelines that students should follow. There shall not be any ambiguity in these aspects at the end or during the course of assessment.

13.Accessibility Statement

A statement indicating the instructor's commitment to providing accessible learning materials and accommodations for students with disabilities. The resources available for PWD students must be provided or described.

14.Course Learning Management System (LMS):

Since LMS has become inevitable in teaching learning environment, all instructions must be prepared to deliver the course through LMS platform. Students must be guided on how to access the course on the institution's learning management system, including login information and technical support contacts.

15.Course Evaluation and Feedback:

Information on how students can provide feedback on the course, teaching, and materials, along with a timeline for course evaluations. A transparent and continuous feedback mechanism from students, parents etc. can be made available at the institutional. Departmental, course level. LMS can also be adopted for this purpose.

16.Employability of the Course

Students may be provided with information about the employability of learning this specific course or subject. It is through which the learner attains ability to prepare with the skills, knowledge, and qualifications needed to secure employment in their chosen field or industry.

17.Emerging Areas of Knowledge of the Course

Information about the recent advances and emerging knowledge areas of the course so that student can navigate with the higher knowledge of the course or choose appropriate selection of the course in detail.

PART V

Samples of Foundation Courses

INTRODUCTION

Foundation Courses typically cover foundational knowledge in various disciplines, depending on the program. They provide students with a broad understanding of key concepts, theories, and principles related to the field of study. It also constitutes instruction in essential academic and practical skills. These can range from critical thinking and research skills to laboratory techniques, depending on the program's focus. They lay the groundwork for more advanced coursework in the major, equipping students with the necessary background and prerequisites to tackle higher-level, specialized courses.

Foundation Courses may also expose students to interdisciplinary perspectives, helping them see how their chosen field of study connects to others. This can encourage a broader worldview and the ability to solve complex problems that require knowledge from multiple disciplines.

Following section provides some sample courses of foundation nature applicable to all disciplines. The typical components expected to be showcased in a Course design are provided in it. The Titles and contents vary according to the specific needs.

Living Planet Earth is such a sample course through which fundamental idea about the basic aspects of plant earth is offered. The course can contribute to scientific literacy by helping students gain essential knowledge about the Earth's geological history, natural hazards, climate, and environmental issues applicable to a number of disciplines. This knowledge can be valuable for informed citizenship

Course Code FC-0106:

Course Title: LIVING PLANET EARTH

Total Credits	3	L:T:P	2:0:1	Total duration	60 hours

COURSE OVERVIEW

The Course Title describe limits to the impacts of human activities on the Earth system. Beyond these limits, the environment may not be able to self-regulate anymore. Crossing a planetary boundary comes at the risk of abrupt environmental change. The Foundation Course in Planet Earth is designed to introduce students to the concept of planetary boundaries and the critical environmental challenges facing our planet. This course provides a comprehensive understanding of the Earth's ecological limits and explores the interconnections between human activities and the health of our ecosystems. Through a multidisciplinary approach, students will gain knowledge and develop the skills necessary to assess, monitor, and address the urgent issues related to planetary boundaries of our Mother Earth.

COURSE OBJECTIVES

Course objectives can be written in a way that aligns with either modules or units, depending on the structure and organization of the course. When a course is divided into modules or thematic sections, you can frame course objectives to align with each module. Each module can have its set of objectives that contribute to the overall goals of the course.

This Course will:

- Introduce students to the concept of planetary boundaries and the scientific framework behind it.
- Explore the various Earth systems, including climate change, biodiversity loss, land use, freshwater use, chemical pollution, and others, that define the planetary boundaries.
- Examine the human impacts on these systems and the consequences for ecosystems and human well-being.
- Familiar with some case studies and real-world examples to understand the complex interactions between human societies and the environment.
- Develop critical thinking skills to evaluate strategies and solutions aimed at preserving the Earth's ecosystems within safe operating boundaries.
- Foster awareness and a sense of responsibility for sustainable practices and environmental conservation.

COURSE OUTCOMES (COs)

These Course Outcomes represents cognitive levels of Blooms Revised Taxonomy (2001)

- Illustrate the serious of human activities that have significant impacts on the Earth system, such as deforestation, industrial pollution, and greenhouse gas emissions. (U) 10 Hours

- Understand different types of environmental impacts caused by human activities and classify them into categories, such as land degradation, air pollution, water contamination, and climate change (U) 10 Hours
- Explain the mechanisms and processes through which human activities affect the Earth system, using appropriate examples and illustrations. They will understand how activities like fossil fuel combustion contribute to global warming or how deforestation disrupts ecosystems (Ap) 10 hours
- Analyse the consequences and evaluate the severity of human-induced impacts on the Earth system. They will critically assess the environmental, social, and economic implications of activities like urbanization or intensive agriculture (An) 10 Hours
- Discuss strategies, policies, and practices that can help humanity operate within the safe operating space defined by the boundaries, promoting sustainable development and resilience (Ap) 10 Hours
- Develop the communication skills to effectively convey the importance of sustainable practices to various stakeholders. They will develop persuasive arguments, engage in dialogue, and present their ideas in a clear and compelling manner to influence decision-making processes (Ap) 10 Hours

REFERENCE TEXT BOOKS

For a foundation course related to earth science, some important textbooks that cover key concepts and topics are provided below:

- "Earth: An Introduction to Physical Geology" by Edward J. Tarbuck, Frederick K. Lutgens, and Dennis G. Tasa
- "Physical Geology" by Charles C. Plummer, Diane H. Carlson, and Lisa Hammersley
- "The Changing Earth: Exploring Geology and Evolution" by James S. Monroe and Reed Wicander
- Arthur Holmes, Principles of Physical Geology (Edinburgh: Thomas Nelson and Sons, 1944 and New York: Ronald Press, 1945.
- "Geology" by Frank H. T. Rhodes, Richard O. Stone, and Bruce D. Marsh
- "Essentials of Geology" by Frederick K. Lutgens, Edward J. Tarbuck, and Dennis G. Tasa (A widely used introductory textbook, it covers the fundamental concepts of geology, including minerals, rocks, plate tectonics, and geological processes.)
- "Earth: An Introduction to Physical Geology" by Edward J. Tarbuck and Frederick K. Lutgens (This textbook offers a detailed exploration of the physical aspects of geology, including Earth's materials, landscapes, and geological hazards.)

- Carlson, Plummer and McGeary: Physical Geology– Earth revealed, Published by McGraw-Hill, 2006
- Frederick K. Lutgens, Essentials of Geology (11th Edition) Pearson Prentice Hall, Pearson Education, Inc. New Jersey, 2012.
- "Geological Field Techniques" by Angela L. Coe
  (This practical guidebook offers insights into fieldwork techniques, including geological mapping, data collection, and analysis.)
- "Geological Maps: An Introduction" by Edgar W. Spencer
  (A valuable resource for understanding geological maps and their interpretation, this book covers the basics of map reading and geologic symbols.)
- Geomorphology: The Mechanics and Chemistry of Landscapes" by Robert S. Anderson and Suzanne P. Anderson
  (Focusing on the study of landforms and the processes that shape Earth's surface, this textbook explores the dynamics of erosion, weathering, and landscape evolution)
- "Textbook of Geology: General Geology for Degree Students" by A. B. Roy

The above texts can provide a strong basis for geoscience and are utilised extensively in undergraduate geology programmes. For specific needs related to your curriculum, it is advised to consult the respective faculty of your discipline.

ASSESSMENT METHODS

Question Papers (Sample questions using revised Bloom's Taxonomy action verbs):

(CEE or SEE Assessment Mode)

Remembering: (1 mark each)

1. List the three major types of rocks and provide a brief description of each.
2. Recall the characteristics of igneous rocks.
3. Identify the layers of the Earth's interior.

Understanding (1 or 2 marks each)

1. Explain how the rock cycle operates and its significance in the formation of different rock types.
2. Summarize the process of plate tectonics and how it influences geological activity.
3. Discuss the concept of erosion and its role in shaping landforms.

Applying (3 marks each):

1. Analyse a geological map and determine the types of rocks present in different areas.
2. Apply the principles of relative dating to determine the sequence of geological events in a given area.
3. Propose a suitable location for drilling an oil well based on geological factors.

Analyzing (5 marks):

1. Compare and contrast the features of a volcanic eruption and an earthquake in terms of their causes and effects.

2. Evaluate the impact of climate change on the melting of glaciers and its consequences for the geological landscape.
3. Analyse the geological hazards associated with living near a fault line and propose mitigation strategies.

Evaluating (5 marks):

1. Assess the effectiveness of various methods used to predict and monitor volcanic eruptions.
2. Evaluate the environmental impact of mining activities on the surrounding geology and ecosystems.
3. Justify the importance of preserving geological sites of significance for scientific research and public education.

Creating (5 marks):

1. Design a geological field guide for a specific region, including key rock formations and geological processes.
2. Devise a geological model to explain the formation of a specific landform, considering different geological forces at play.
3. Develop a comprehensive plan for a sustainable and environmentally conscious approach to resource extraction in a geologically sensitive area.

These sample questions cover various levels of cognitive complexity, from remembering basic facts to creating new ideas and solutions within the field of geology.

ACTIVITIES

Classroom Activities:

1. Lecture and Discussion: Present foundational concepts of geology, such as rock types, plate tectonics, and geological time scales. Engage students in discussions to reinforce understanding.
2. Virtual Field Trips: Utilize virtual tools to take students on virtual field trips to famous geological sites. Discuss the geological formations, processes, and history associated with each site.
3. Interactive Presentations: Assign students topics related to geology and ask them to create interactive presentations using multimedia tools. Encourage them to include images, videos, and interactive elements to enhance understanding.
4. Case Studies: Provide real-world geological case studies and ask students to analyse and interpret the data. Discuss the implications of the findings and encourage critical thinking and problem-solving skills.
5. Group Debates: Assign controversial topics in geology and divide the class into groups. Conduct debates where each group presents arguments supporting their assigned position. Encourage critical analysis and evidence-based reasoning.

Lab Activities:

1. Rock and Mineral Identification: Set up a lab with various rock and mineral samples. Provide identification guides and ask students to identify the samples using physical properties and simple tests, such as hardness, lustre, and streak.

2. Stratigraphy and Fossil Analysis: Provide sedimentary rock layers with embedded fossils of megascopic types, fossil woods. Instruct students to observe and analyse the fossils to determine the relative age of the rock layers and reconstruct the geological history.

3. Topographic Map Interpretation: Give students topographic maps /toposheets of a specific area and teach them how to interpret contour lines, relief, reading the elevation changes, and landforms. Assign exercises where students identify features and create cross-sections.

4. Earthquake Studies: Simulate earthquakes using a shake table or software. Ask students to measure the intensity, record data, and analyse the effects of different magnitudes and focal depths.

5. Groundwater Exploration: Set up a groundwater model using sand, gravel, and water. Instruct students to observe water flow, identify zones of saturation and unsaturation, and discuss concepts such as aquifers and groundwater contamination.

Field Activities:

1. Geological Site Visits: Organize field trips to nearby geological sites, such as national parks, cliffs, or river valleys. Guide students through the observation and interpretation of rock formations, landforms, and geological processes.

2. Geologic Mapping: Holding and handling of filed compass and taking accurate bearings and azimuths. Assign small groups of students to conduct geological mapping exercises in a designated area. Instruct them to identify rock types, measure strike and dip, and create a detailed geological map.

3. Soil Profiles and Weathering: Take students to a location with different soil profiles. Instruct them to observe the layers, analyse the composition, and discuss the weathering processes responsible for their formation.

4. Stream Erosion and Deposition: Visit a river or stream to study erosion and deposition processes. Instruct students to measure channel characteristics, collect sediment samples, and discuss the formation of landforms such as meanders and deltas.

5. Volcanic Features Exploration: Visit volcanic sites or regions with volcanic features. Observe and discuss volcanic landforms, such as craters, lava flows, and volcanic cones. Explain the associated volcanic processes and hazards.

Remember to adapt these activities based on the resources available, safety considerations, and the specific learning objectives of your course.

RUBRICS FOR ASSESSMENT

Assessment should be based on some rubrics relevant to the specific assessment items. A rubric is a criteria and standards set out for assessing different levels of performance. Rubrics are essential in assessment because they promote fairness, consistency, transparency, and constructive feedback. They must align assessments with learning outcomes, save time for instructors, and support data-driven decision-making.

Well-designed rubrics enhance the quality of assessment practices and contribute to meaningful learning outcomes.

In case of Seminar or Assignments, the following sample rubrics can be used. Rubrics must be communicated to the students well in advance of an assessment method.

Seminar	
Structure	20 %
Content	50 %
Coherence	20 %
Language & Clarity	10 %

Assignments	
Structure	30 %
Content	30 %
Clarity	20 %
Neatness	20 %

EMPLOYABILITY FOR GEOLOGY PROGRAMMES

For those who have finished an undergraduate (UG) programme in geology, the field of geology offers a wide variety of employment prospects. Geologists are experts in the structure, functions, and history of the Earth and are sought after in a variety of fields. Here are some potential career paths and sectors where geology graduates can find employment:

1. Environmental Consultancy: Geologists are important contributors to the assessment and reduction of environmental consequences. They work on initiatives involving environmental evaluations, site remediation, groundwater management, and the creation of environmental policies.
2. Natural Resources and Mining: Geologists are involved in the exploration, extraction, and management of natural resources such as oil, gas, coal, minerals, and precious metals. They work in companies engaged in mining, oil and gas exploration, and related industries.
3. Geological Surveys and Government Agencies: Geological surveys, governmental organisations, and academic institutions all employ geologists. They support geological mapping, resource evaluation, risk assessment, and land-use planning.
4. Energy Sector: In Geologists are sought after in the renewable energy sector, especially for geothermal and hydroelectric projects. They contribute to site selection, resource assessment, and environmental impact studies.
5. Construction and Engineering: Geologists provide geotechnical expertise in construction projects, including assessing soil stability, foundation design, and slope stability. They collaborate with civil engineers and construction companies.
6. Geotechnical Consultancy: Geologists assess the geological and geotechnical aspects of infrastructure projects, including tunnels, bridges, dams, and highways. They evaluate geological hazards and provide recommendations for safe construction.

7. Environmental and Geological Education: Geology graduates can pursue teaching and research positions in academic institutions. They can become professors, researchers, or work in educational outreach programs.

8. Environmental Regulation and Policy: Geologists contribute to the development and implementation of environmental regulations and policies. They work in government agencies, NGOs, and environmental advocacy organizations.

9. Hydrogeology and Water Resources: Geologists specializing in hydrogeology focus on studying groundwater systems and water resources. They work on projects related to water supply, contamination assessment, and water management.

10. Geoscience Technology and Consulting: Geologists can work in the technology sector, providing consulting services and developing software tools for geological data analysis, modeling, and visualization.

These are just a few examples of the employment opportunities available to geology graduates. The actual scope of employability may vary depending on factors such as job market conditions, geographical location, additional skills, and further education (e.g., postgraduate studies). It's advisable for geology students to gain practical experience through internships, fieldwork, and research projects to enhance their employability prospects.

Emerging Research Areas for Geology Graduates

Some of the key areas in earth science which nurtures innovative research

- Climate Change and Global Warming: Earth science study has concentrated on comprehending the causes, effects, and mitigation techniques of climate change and global warming as one of the most important issues facing our world. This entails researching the Earth's climate system, alterations in the composition of the atmosphere, sea level rise, extreme weather, and how human activities contribute to climate change.
- Earth System Modeling: The behaviour of the interdependent parts of the Earth system, such as the atmosphere, oceans, land surfaces, and ice, can be predicted and simulated using earth system models, which are essential instruments in this process. The goal of this research is to increase the models' precision and resolution, provide feedback mechanisms, and make it easier for us to predict changes in the future..
- Geoengineering and Climate Intervention: In response to the challenges posed by climate change, researchers are exploring the concept of geoengineering, which involves deliberate large-scale manipulation of the Earth's systems to counteract or mitigate the effects of climate change. This includes ideas such as solar radiation management and carbon dioxide removal techniques.
- Earthquake and Volcano Dynamics: Understanding the processes behind earthquakes and volcanic eruptions is crucial for hazard assessment and risk management. Research in this area involves

studying the factors that influence seismic and volcanic activity, monitoring techniques, early warning systems, and the development of predictive models.

- Earth Observation and Remote Sensing: With the advancements in satellite technology, Earth observation and remote sensing have become integral to Earth science research. These tools provide valuable data on various Earth processes, including climate patterns, land use changes, natural hazards, and the health of ecosystems. Researchers continue to develop new methods for analyzing and interpreting remote sensing data.
- Planetary Science and Astrobiology: The study of other planets, moons, and celestial bodies within our solar system and beyond is an exciting area of Earth science. Researchers are investigating the geological and atmospheric processes on other planets, the potential for habitability, the search for signs of life, and the origins of life on Earth.
- Environmental Sustainability and Resource Management: As human activities continue to impact the environment, research in Earth science increasingly focuses on sustainable management of Earth's resources. This includes studying ecosystems, biodiversity, water resources, land-use planning, pollution monitoring, and sustainable energy solutions.
- Natural Hazards and Disaster Risk Reduction: Understanding and mitigating the risks associated with natural hazards, such as hurricanes, floods, tsunamis, and landslides, is a crucial area of research. This involves improving early warning systems, hazard mapping, risk assessment, and developing strategies for disaster preparedness and response

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Since our four-year UG program has a strong emphasis on critical thinking, scientific methodology, or interdisciplinary studies, a course on philosophy of science can provide a solid foundation. It can help students develop a deeper understanding of how science works, its limitations, and its impact on society. It explores fundamental questions about the nature of knowledge, truth, evidence, and scientific reasoning. It can also help students develop a broader perspective on their field of study and encourage them to think critically about the assumptions underlying scientific research.

Course Code FC-0106:

Course Title: PHILOSOPHY OF SCIENCE

Total Credits	3	L:T:P	2:0:1	Total duration	60 hours

COURSE OVERVIEW

The Philosophy of Science course is designed to introduce undergraduate students to the fundamental concepts and theories in the philosophy of science. The course will explore various philosophical perspectives on the nature of science, including empiricism, rationalism, and the scientific method. Students will critically analyse the strengths and limitations of different philosophical approaches, such as positivism,

falsificationism, and constructivism, in order to develop a deeper understanding of how scientific knowledge is produced and evaluated. The course will also delve into ethical and social implications of scientific research, the nature of scientific explanation and prediction, and the interdisciplinary nature of science. Through engaging discussions, critical analysis of case studies, and philosophical reflections, students will develop their analytical and reasoning skills while gaining a broader perspective on the role of science in society and its impact on human understanding.

COURSE OBJECTIVES

Course objectives can be written in a way that aligns with either modules or units, depending on the structure and organization of the course. When a course is divided into modules or thematic sections, you can frame course objectives to align with each module. Each module can have its set of objectives that contribute to the overall goals of the course.

This Course will provide a fundamental idea about the

- Foundational concepts and theories in the philosophy of science, including empiricism, rationalism, and the scientific method.
- Different philosophical perspectives on the nature of science, such as positivism, falsificationism, and constructivism.
- Ethical and social implications of scientific research and technological advancements.
- Various approaches to scientific explanation and prediction, including induction, deduction, and inference to the best explanation.
- Develop critical thinking and logical reasoning skills through scholarly discourse and argumentation on philosophical debates in the philosophy of science.
- Interdisciplinary nature of science and its relationship with other fields, such as ethics, sociology, and epistemology, to gain a broader understanding of scientific knowledge and its impact on society.

COURSE OUTCOMES (CO)

These Course Outcomes are designed using Actions verbs of six Cognitive Process based on Blooms Revised Taxonomy (2001).

- Explain the foundational concepts and theories in the philosophy of science, including empiricism, rationalism, and the scientific method, to demonstrate understanding of the philosophical underpinnings of scientific inquiry and knowledge production (U) 10 Hours
- Outline the strengths and limitations of different philosophical perspectives on the nature of science, such as positivism, falsificationism, and constructivism, in order to critically assess scientific claims and theories. (U) 10 Hours
- Apply critical thinking and logical reasoning skills to examine the ethical and social implications of scientific research and technological advancements, considering issues such as scientific responsibility, bias, and the impact on marginalized communities. (Ap) 10 hours
- Compare major philosophical approaches to scientific explanation and prediction, including induction, deduction, and inference to the best explanation, to evaluate the validity and reliability of scientific theories and models. (U) 10 Hours

- Examine well-reasoned arguments and engage in scholarly discourse on philosophical debates in the philosophy of science, utilizing appropriate evidence and logical frameworks to support and defend one's viewpoints. (Ap) 10 Hours
- Inspect the interdisciplinary nature of science and its relationship with other fields, such as ethics, sociology, and epistemology, to recognize the broader context and implications of scientific knowledge and its role in shaping society and human understanding. (Ap) 10 Hours

REFERENCE TEXT BOOKS

For a foundation course in B.Sc. Geology, here are some important textbooks that cover key concepts and topics:

- "Philosophy of Science: A Very Short Introduction" by Samir Okasha: This book offers a concise and clear introduction to the central questions and key concepts in the philosophy of science. It covers topics such as scientific method, theories, explanation, and the nature of scientific knowledge.
- "An Introduction to the Philosophy of Science" by Kent W. Staley: This textbook provides a comprehensive overview of the philosophy of science, exploring topics such as scientific reasoning, scientific realism, and the social dimensions of science. It also includes case studies and exercises to deepen understanding.
- "Philosophy of Science: Key Concepts" by Steven French: This book presents key concepts and theories in the philosophy of science in a concise and accessible manner. It covers topics such as induction, causation, laws of nature, and the nature of scientific explanation.
- "What Is This Thing Called Science?" by Alan Chalmers: This introductory textbook explores the nature of science and its methodology. It discusses important philosophical issues in science, such as the demarcation between science and pseudoscience, and the role of observation and experimentation.
- "Understanding Philosophy of Science" by James Ladyman: This book provides a comprehensive introduction to the philosophy of science, covering topics such as scientific explanation, scientific realism, and the relationship between science and society. It includes case studies and examples to illustrate key concepts.

- "Philosophy of Science: A Very Short Introduction" by Samir Okasha: This book offers a concise and clear introduction to the central questions and key concepts in the philosophy of science. It covers topics such as scientific method, theories, explanation, and the nature of scientific knowledge.
- "An Introduction to the Philosophy of Science" by Kent W. Staley: This textbook provides a comprehensive overview of the philosophy of science, exploring topics such as scientific reasoning, scientific realism, and the social dimensions of science. It also includes case studies and exercises to deepen understanding.
- "Philosophy of Science: Key Concepts" by Steven French: This book presents key concepts and theories in the philosophy of science in a concise and accessible manner. It covers topics such as induction, causation, laws of nature, and the nature of scientific explanation.
- "What Is This Thing Called Science?" by Alan Chalmers: This introductory textbook explores the nature of science and its methodology. It discusses important philosophical issues in science, such as the demarcation between science and pseudoscience, and the role of observation and experimentation.

- "Understanding Philosophy of Science" by James Ladyman: This book provides a comprehensive introduction to the philosophy of science, covering topics such as scientific explanation, scientific realism, and the relationship between science and society. It includes case studies and examples to illustrate key concepts.

These textbooks provide a solid foundation for studying geology and are widely used in undergraduate geology programs. It is also advised to consult the respective faculty for specific recommendations for the appropriate text books for the course.

ASSESSMENT METHODS

The following questions cover a range of cognitive processes according to the revised Bloom's Taxonomy, including remembering (R), understanding (U), applying (Ap), analyzing (An), evaluating (E), and creating (C). They can be used to assess and stimulate critical thinking skills in a foundation course on the "Philosophy of Science" at the undergraduate level. These types of questions can be used in all types of assessment methods.

- What are the main branches of philosophy of science? (R)
- Define the scientific method and its components (R)
- Identify key historical figures in the development of the philosophy of science (R)
- Explain the difference between inductive and deductive reasoning in science (U)
- Describe the concept of falsifiability and its significance in scientific theories (U)
- Illustrate the positivist and post-positivist views of scientific knowledge (U)
- Identify a scientific experiment and identify the independent and dependent variables (Ap)
- Apply the principles of Occam's razor to evaluate competing scientific hypotheses (Ap)
- Utilise a scientific theory and identify potential areas for improvement or further investigation (Ap)
- Examine the ethical implications of scientific research and technological advancements (An)
- Outline the role of models and simulations in scientific inquiry (U)
- Compare and contrast the concepts of theory and observation in scientific practice (U)
- Determine the strengths and limitations of different scientific research methods (E)
- Assess the impact of cultural and social factors on the development of scientific knowledge (E)
- Analyse the role of peer review in ensuring the validity and reliability of scientific research (An)
- Design an experiment to test a specific scientific hypothesis (C).
- Develop a framework for evaluating the ethical implications of emerging scientific technologies (C)
- Select a new scientific theory to explain a currently unexplained phenomenon (Ap).
- Construct an argument for or against the demarcation of science from pseudoscience (C).
- Design a curriculum for a course on the philosophy of science for high school students (C)

ACTIVITIES

Classroom Activities:

- Debates: Divide the class into groups and assign them different philosophical perspectives on a specific scientific topic or theory. Have each group present their arguments and engage in a debate where they can challenge and critique each other's positions.
- Case Studies: Provide students with real-life examples of scientific controversies or ethical dilemmas. Ask them to analyse the case, identify the underlying philosophical issues, and propose possible resolutions based on different philosophical frameworks.
- Thought Experiments: Present students with philosophical scenarios or "what if" questions related to the philosophy of science. For example, ask them to imagine a world where scientific experimentation is prohibited and discuss the implications for knowledge and progress.
- Concept Mapping: Have students create concept maps to visually represent the interconnections between different philosophical concepts in the philosophy of science. This activity helps them understand the relationships between ideas and promotes critical thinking.

- Socratic Dialogue: Facilitate a Socratic dialogue session where students engage in a structured discussion to explore fundamental questions and concepts in the philosophy of science. Encourage open-ended questioning, active listening, and thoughtful responses.
- Historical Analysis: Assign students to research and present on the contributions of significant philosophers of science throughout history. This activity allows students to delve into the historical context, understand the evolution of scientific thought, and appreciate different perspectives.
- Ethical Dilemma Scenarios: Provide students with ethical dilemmas arising from scientific advancements or research. Ask them to analyse the ethical implications, consider different ethical frameworks, and discuss the potential consequences of different courses of action.
- Collaborative Problem-Solving: Assign students complex philosophical problems or paradoxes related to the philosophy of science and encourage them to work in groups to find creative and reasoned solutions. This activity fosters teamwork, critical thinking, and logical reasoning skills.
- Guest Speakers: Invite guest speakers from different disciplines, such as scientists, philosophers, or science historians, to share their perspectives on the philosophy of science. Students can engage in discussions, ask questions, and gain insights from experts in the field.
- Field Trips or Lab Visits: Organize visits to scientific research institutions, laboratories, or science museums to provide students with firsthand experiences of scientific practices and engage them in discussions about the philosophical aspects of scientific inquiry.

These activities aim to create an interactive and engaging learning environment for students, encouraging them to actively explore and apply philosophical concepts in the context of science.

Lab Activities:

While the philosophy of science primarily involves theoretical and conceptual discussions, incorporating lab activities can enhance the understanding and application of philosophical principles.

- Experimental Design and Bias: Conduct a simple experiment with multiple variables and discuss the role of bias in experimental design. Students can explore how bias can affect the validity and reliability of scientific results, prompting philosophical discussions on objectivity and methodology.
- Replication and Reliability: Choose a classic experiment from the history of science and have students replicate it. Afterward, encourage them to compare their results with the original study and discuss the implications of replication for scientific knowledge and the philosophy of science.
- Ethics in Scientific Research: Present students with ethical dilemmas commonly encountered in scientific research. Ask them to analyse and discuss the ethical implications of different scenarios, exploring the intersection of ethics and scientific practice.
- Data Analysis and Interpretation: Provide students with a dataset and ask them to analyse and interpret the data. Emphasize the importance of statistical methods in drawing conclusions and engage in discussions about the philosophy of statistics, data interpretation, and the influence of subjectivity.
- Paradigm Shifts: Expose students to historical examples of paradigm shifts in scientific thinking, such as the Copernican revolution or the discovery of DNA's structure. Have students reflect on the philosophical implications of such paradigm shifts and discuss the role of evidence, theories, and scientific progress.
- Observational Studies: Conduct an observational study or encourage students to design their own observational research project. Discuss the challenges of observational studies, the role of interpretation, and the philosophical debates around the objectivity of observations.
- Model Construction: Introduce students to the concept of scientific modeling and its philosophical implications. Have them build physical or conceptual models to represent scientific phenomena and discuss the strengths and limitations of different modeling approaches.
- Experimental Error and Uncertainty: Design an experiment where students can explore sources of experimental error and uncertainty. Discuss the philosophy of measurement, the limitations of precision, and the impact of uncertainty on scientific knowledge.
- Historical Experiments: Recreate historical experiments that led to significant scientific discoveries. Allow students to experience the scientific process firsthand and engage in philosophical discussions about the nature of experimentation, hypothesis formation, and the role of serendipity in scientific breakthroughs.

- Peer Review Simulation: Simulate a peer review process where students evaluate and critique each other's scientific papers/assignments or research proposals. This activity can provide insights into the philosophy of science's peer review system, the evaluation of scientific claims, and the role of consensus-building.

These lab activities provide hands-on experiences that complement the theoretical discussions of the philosophy of science. They encourage critical thinking, data analysis, and application of philosophical principles in scientific contexts.

Field Activities:

Incorporating field activities into a foundation course on the "Philosophy of Science" can offer students practical experiences that connect theoretical concepts with real-world applications. Here are a few field activities to consider:

- Science Museum Visit: Organize a field trip to a science museum where students can explore interactive exhibits and engage with scientific demonstrations. Encourage them to reflect on the philosophical implications of the exhibited phenomena and discuss the relationship between science, public understanding, and cultural perspectives.
- Laboratory Tour: Arrange a visit to a scientific research laboratory or facility. Students can observe scientists in action, interact with researchers, and gain insights into the practical aspects of scientific inquiry. Prompt discussions about the role of experimentation, data collection, and scientific collaboration in shaping scientific knowledge.
- Nature Observation: Take students on a nature observation excursion, such as a hike in a nearby park or a visit to a botanical garden. Encourage them to observe natural phenomena, document their findings, and discuss the philosophical aspects of scientific observation, classification, and ecological interrelationships.
- Guest Speaker from the Scientific Community: Invite a scientist or a science communicator to speak to the class about their research, experiences, and perspectives on the philosophy of science. Allow students to engage in a Q&A session and encourage discussions on the interface between scientific practice, philosophy, and society.
- Science Communication Workshop: Organize a workshop focused on science communication skills. Students can learn how to effectively convey scientific concepts to the general public, discuss the role of language and clarity in scientific communication, and explore the ethical considerations of science dissemination.
- Field Data Collection: Assign students a field research project where they collect and analyse data related to a scientific phenomenon. This could involve ecological surveys, weather measurements, or observational studies. Students can reflect on the philosophical implications of data collection, interpretation, and the role of observation in scientific knowledge.
- Industry Visit: Arrange a visit to a science-based industry or technology company. Students can observe how scientific research and development are applied in practical settings, explore the ethical and social implications of technological advancements, and discuss the relationship between science, industry, and innovation.
- Public Lecture Attendance: Encourage students to attend public lectures or panel discussions on topics related to the philosophy of science. This could include talks on the ethics of scientific research, the philosophy of mind in relation to neuroscience, or debates on controversial scientific issues. Students can then reflect on the presented perspectives and engage in critical discussions.
- Historical Site Visits: Visit historical sites related to scientific breakthroughs or significant scientific events. This could include locations associated with famous scientists or landmarks of scientific discovery. Students can explore the historical context, reflect on the philosophy of science during those times, and discuss the impact of historical developments on modern scientific understanding.
- Collaborative Field Research: Facilitate group field research projects where students work together to investigate a scientific problem or question. This can involve designing experiments, conducting field observations, or collecting data. Students can then present their findings and engage in philosophical discussions about the research process, methodology, and the role of empirical evidence.

These field activities offer students opportunities to engage with science in real-world contexts, observe scientific practices, and connect philosophical concepts with practical applications. They encourage critical thinking, foster a deeper understanding of the philosophy of science, and provide memorable experiences that enhance the learning process. The faculty can choose the suitable activities for their learners as per the requirements of the course.

RUBRICS FOR ASSESSMENT

Assessment should be based on some rubrics relevant to the specific assessment items. A rubric is a criteria and standards set out for assessing different levels of performance. In case of Seminar or Assignments, the following sample rubrics can be used. Rubrics must be communicated to the students well in advance of an assessment method.

Seminar	
Structure	20 %
Content	50 %
Coherence	20 %
Language & Clarity	10 %
Assignments	
Structure	30 %
Content	30 %
Clarity	20 %
Neatness	20 %

RELEVANCE OF LEARNING PHILOSOPHY OF SCIENCE

- Understanding the philosophy of science equips students with critical thinking skills, a deeper appreciation of scientific knowledge, and the ability to critically evaluate scientific claims.
- It delves into topics such as the scientific method, the demarcation between science and pseudoscience, the role of observation and experimentation, and the ethics of scientific research.
- By engaging in philosophical discussions and analyses, students gain a comprehensive understanding of the strengths and limitations of scientific knowledge. They learn to critically assess scientific theories, evaluate evidence, and recognize the social, cultural, and historical factors that influence scientific progress.
- Moreover, the course fosters a broader perspective on the relationship between science and society. It encourages students to reflect on the ethical implications of scientific advancements, the responsibilities of scientists, and the impact of science on our lives. They develop a nuanced understanding of science as a social enterprise, considering issues such as scientific consensus, bias, and the interaction between science and policy-making.
- The philosophy of science also serves as a bridge between the natural and social sciences, highlighting the interconnectedness of different disciplines and promoting interdisciplinary thinking. Students gain insights into how scientific knowledge is constructed, debated, and refined across various fields.
- Ultimately, the foundation course on "Philosophy of Science" empowers undergraduate students to think critically, engage in informed discussions, and navigate the complexities of scientific information in an ever-changing world. It equips them with valuable skills that are applicable to a wide range of disciplines and prepares them for further academic pursuits or careers in fields that rely on scientific reasoning and understanding.

PART VI

Academic Bank of Credits

INTRODUCTION

The concept of an Academic Bank of Credits (ABC) is a system that allows students in higher education to accumulate, store, and transfer academic credits earned from various courses and institutions. It operates on the principle of recognizing and valuing learning experiences beyond traditional classroom settings. An Academic Bank of Credits (ABC) serves as a central repository for academic credits earned by students. These credits can come from a variety of sources, including:

- Formal Education: Credits earned through traditional courses at accredited institutions.
- Experiential Learning: Credits for learning experiences gained through internships, apprenticeships, research projects, or work experience relevant to the academic program.
- Online Courses and MOOCs: Credits for completing online courses, including Massive Open Online Courses (MOOCs), that align with program requirements.
- Certificates and Short Courses: Credits for completing certificate programs or short courses that cover specific topics related to the academic program.
- Competency-Based Learning: Credits awarded based on demonstrated mastery of specific competencies or skills, often through assessments.

As per National Education Policy 2020, the Academic Bank of Credits (ABC) has been envisaged to facilitate the academic mobility of students with the freedom to study across the Higher Education Institutions in the country with an appropriate "credit transfer" mechanism from one programme to another, leading to attain a Degree/ Diploma/PG-diploma, etc. UGC through Notification No. F. No. 14-31/2018 (CPP-II) dated 28th July, 2021 has published a comprehensive [2]document on ABC and its implementation.

[2] https://www.ugc.gov.in/pdfnews/9327451_Academic-Bank-of-Credicts-in-Higher-Education.pdf

As of my last knowledge update in September 2021, the University Grants Commission (UGC) in India had proposed the concept of an Academic Bank of Credits (ABC) as part of its efforts to reform and modernize the higher education system in the country. Please note that developments may have occurred since then, so I recommend checking the latest information from the UGC or the Indian government for updates on the status and implementation of the ABC system.

The Kerala Curricular Framework describes that the process of accumulating Credits over a period of time, leads to the idea of a 'Credit Bank' Credit Banking, when practiced would go a long way in facilitating credit transfers and learner mobility. Along with the implementation of this curriculum frame work the students will have the right and provisions for the inter departmental, Inter-faculty and inter-university credit transfers between the institutions which follow this frame work. Each board of studies have to identify and notify a set of courses offered by other Board of studies from which the credits can be transferred while framing the syllabus. An Inter University Credit Transfer and Accumulation System (IUCTAS) is to be developed as a tool which will facilitate the students to move between higher educational institutes and universities to have their academic qualifications, which enhances the flexibility of study programmes for students.

ABC an Overview:

The Academic Bank of Credits consists of the following important components. The details of registration and its procedure are provided in the ABC portal (https://www.abc.gov.in).

- Centralized Credit Repository: The UGC proposed the creation of a centralized repository or database to store and manage academic credits earned by students across various higher education institutions in India.
- Accumulation and Transfer of Credits: The ABC system was designed to allow students to accumulate credits from different institutions and academic programs. These credits could be transferred or used towards completing a degree program.
- Flexibility and Mobility: One of the primary objectives of the ABC was to promote flexibility and mobility for students. It aimed to make it easier for students to transfer between institutions or switch between academic programs without losing earned credits.
- Recognition of Prior Learning: The ABC system recognized and valued prior learning experiences, including skills acquired through vocational training, work experience, or other non-traditional avenues. This recognition aimed to reduce redundancy and allow students to complete their education more efficiently.
- Lifelong Learning: The concept of the ABC encouraged lifelong learning by enabling individuals to continue earning credits and pursuing education throughout their lives.
- Credit-Based Approach: Under the proposed system, academic programs and courses would be designed with a credit-based approach, allowing for greater customization of learning pathways.

ABC aims to modernize and reform India's higher education system to better align with international practices and promote a more flexible and learner-centric approach. However, the implementation and adoption of the ABC system would require coordination and cooperation among universities and educational institutions in India.

Procedure to join the ABC Programme

- Register your institution on ABC (www.abc.gov.in).
- Upload data of Student Credits obtained during or after the academic year 2021-22.
- Make the students of your institution aware of the ABC facility and encourage and hand-hold them to open an Academic Bank Account on ABC portal (www.abc.gov.in).
- Create a hyperlink to the ABC URL, i.e., www.abc.gov.in on your institution's respective website's home page.
- Depute the Nodal Officers for implementing ABC and reflecting their details on their websites.
- Higher Educational institutions should get all their students to fill up ABC ID on all examination forms.

Common terms associated with ABC:

Credit Accumulation – The facility created by ABC in the Academic Bank Account opened by students in order to transfer and consolidate the credits earned by them by undergoing courses.

Credits Recognition – The credits earned through a registered Higher Educational Institution are transferred directly to the ABC by such HEIs.

Credit Transfer – The mechanism by which registered HEIs are able to receive or provide prescribed credits to individual Academic Bank Accounts in adherence to the UGC credit norms for the course undertaken by students enrolled in any registered HEI within India.

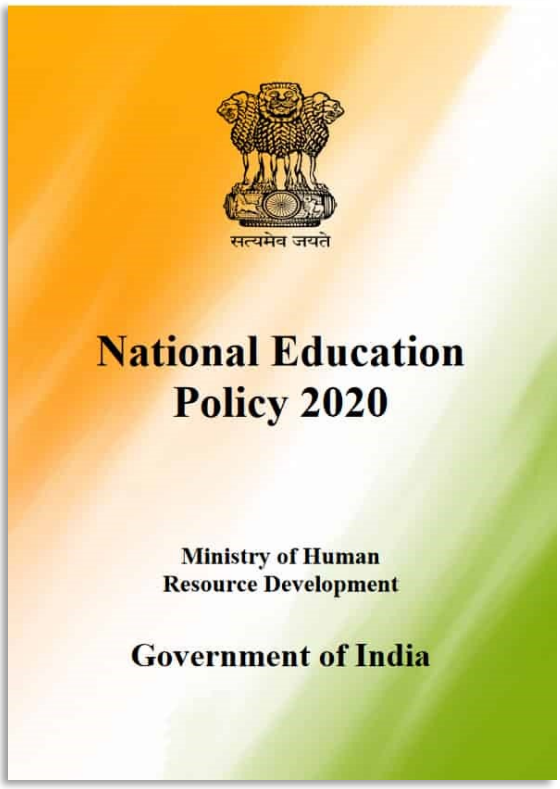
Credit Redemption – The process of commuting the accrued credits in the Academic Bank Accounts of the students maintained in ABC for the purpose of fulfilling the credits requirements for the award of Degrees or Diplomas or Certificates or course work for PhD programmes or similar courses. by the registered degree-awarding HEIs.

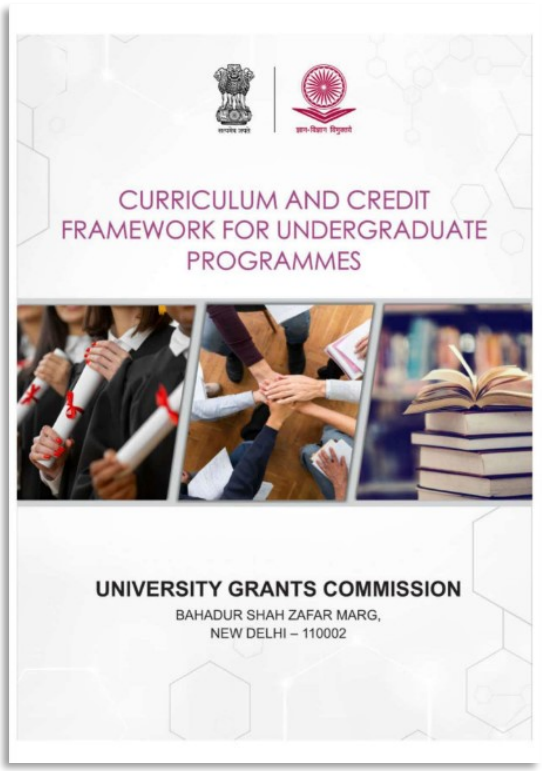
Academic Bank Account – An individual account with the Academic Bank of Credit opened and operated by a student, to which all academic credits earned by the student from course(s) of study are deposited, recognised, maintained, accumulated, transferred, validated or redeemed for the purposes of the award of degree/diploma/certificate etc. by an awarding institution. Credits deposited in the ABC platform will be valid for a maximum of seven years or the duration specified for a given discipline.

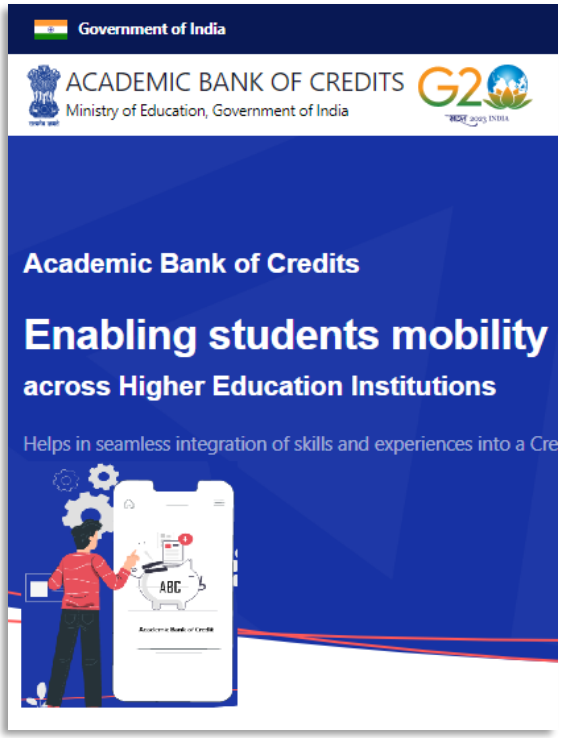
Working Procedure of ABC

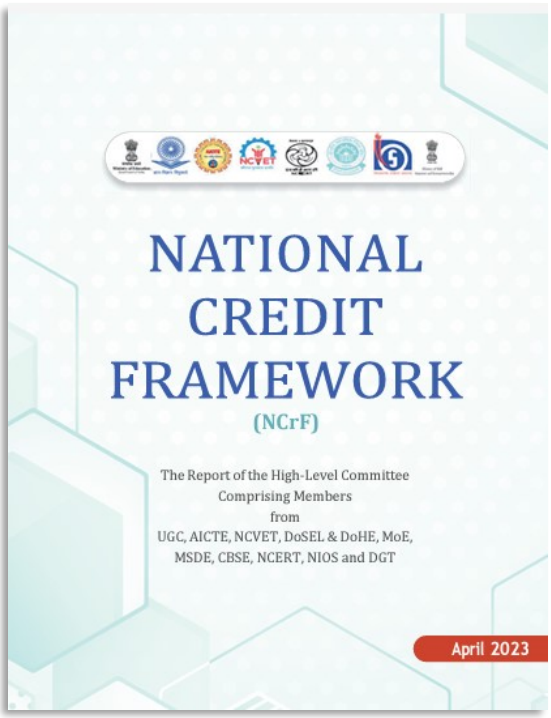
- HEIs and students can open their individual ABC accounts where a unique ID (ABC, Institutional and Student level IDs) and access are provided.
- The portal for accessing the Academic Bank of Credit website is www.abc.gov.in
- Students registering with their mobile number through Digilocker and will be allotted a unique ABC ID.
- The ID can be shared with the Academic Institution in which the student is enrolled.
- Student can log in from the registered mobile to access the ABC Dashboard where the credits are displayed.
- The student can select the desired courses of his/her choice, accumulate the credits earned and initiate the transfer of credits with other necessary requirements to the institute of their choice.
- The institute further checks the eligibility criteria of the student based on UGC guidelines and accepts/rejects the transfer giving proper reasons.
- The students can check the request status at any time and will get notified of credit transfer.
- All credit trials are maintained and reflected in the student's account.

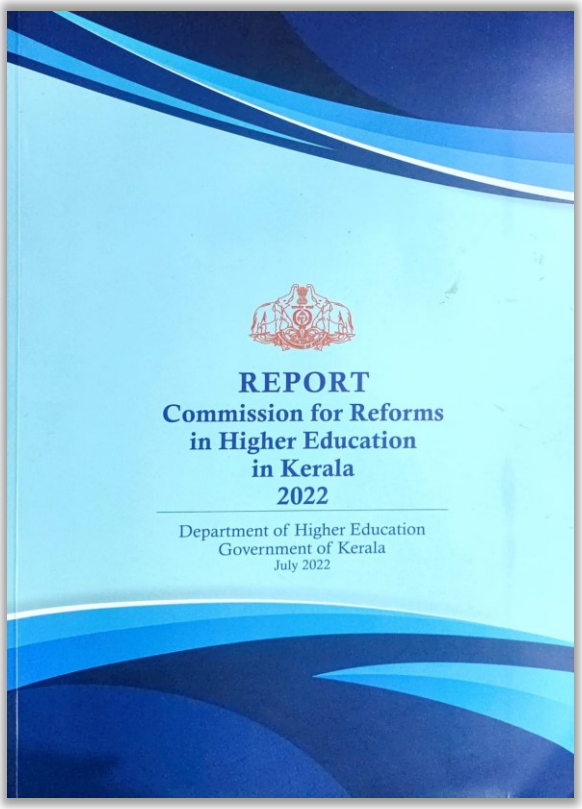
Annexures

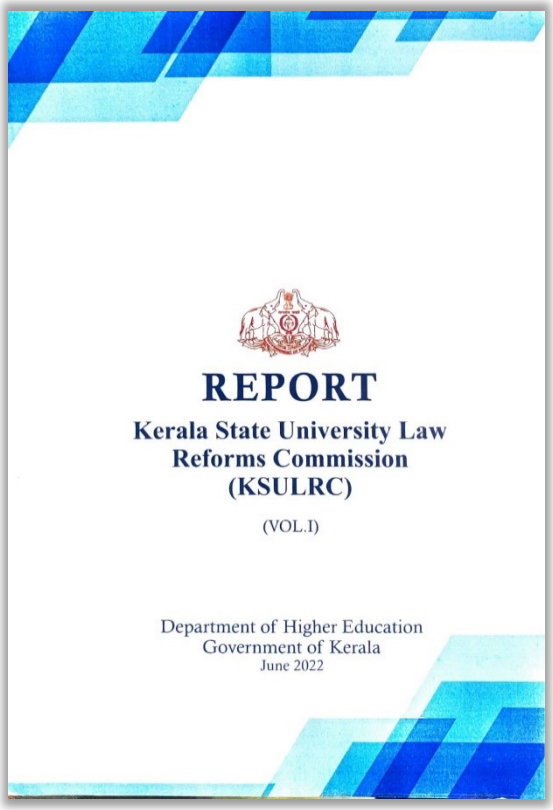

सत्यमेव जयते
National Education Policy 2020
Ministry of Human Resource Development
Government of India


CURRICULUM AND CREDIT FRAMEWORK FOR UNDERGRADUATE PROGRAMMES
UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG,
NEW DELHI – 110002


Government of India
ACADEMIC BANK OF CREDITS
Ministry of Education, Government of India
G20
Academic Bank of Credits
Enabling students mobility
across Higher Education Institutions
Helps in seamless integration of skills and experiences into a Cre
ABC


NATIONAL CREDIT FRAMEWORK
(NCrF)
The Report of the High-Level Committee
Comprising Members
from
UGC, AICTE, NCVET, DoSEL & DoHE, MoE,
MSDE, CBSE, NCERT, NIOS and DGT
April 2023


REPORT
Commission for Reforms
in Higher Education
in Kerala
2022
Department of Higher Education
Government of Kerala
July 2022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Government of Kerala
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Government of Kerala
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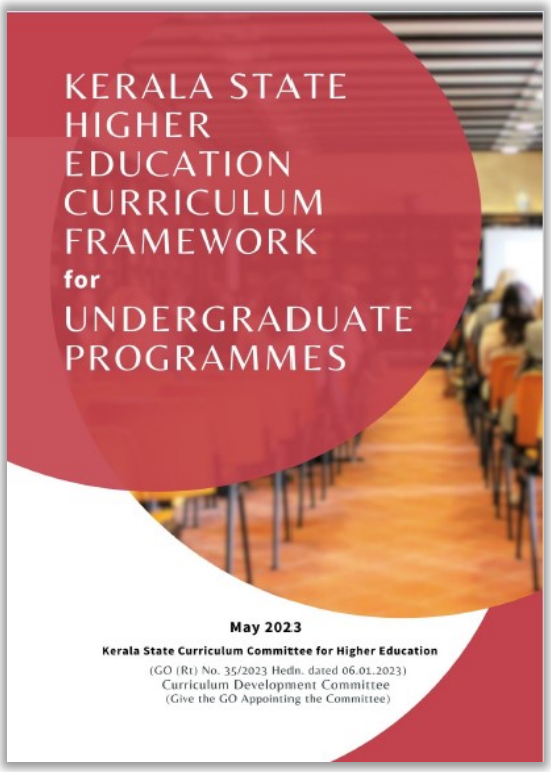
KERALA STATE
HIGHER
EDUCATION
CURRICULUM
FRAMEWORK
for
UNDERGRADUATE
PROGRAMMES
May 2023
Kerala State Curriculum Committee for Higher Education
(GO (Rt) No. 35/2023 Hedn. dated 06.01.2023)
Curriculum Development Committee
(Give the GO Appointing the Committee)

Documents for Refernce:

- *National Education Policy 2020*

https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

- *Curriculum & Credit Framework for Undergraduate programmes*

https://www.ugc.gov.in/pdfnews/7193743_FYUGP.pdf

- *Choice Based Credit & Semester System-Guidelines*

https://www.ugc.gov.in/pdfnews/8023719_guidelines-for-cbcs.pdf

- *Guidelines for providing Skill Based Education under National Skill Qualification Framework*

https://www.ugc.gov.in/pdfnews/6556003_Guidelines-for-providing-Skill-Based-Education-under-NSQF.pdf

- *National Credit Framework (NCrF)*

https://www.ugc.gov.in/pdfnews/9028476_Report-of-National-Credit-Framework.pdf

- *Academic Bank of Credits*

User Manual:

https://www.abc.gov.in/assets/resources/Academic-Bank-of-Credits_User_Manual_V3.pdf

Regulations:

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- *Guidelines for Transforming Higher Education Institutions (HEIs) into Multidisciplinary Institutions.*

https://www.abc.gov.in/assets/resources/9154182_Letter-HEIs-Guidelines-for-Transforming-into-Multidisciplinary-Institutions.pdf

- *Kerala Curricular Framework for UG Programmes*

https://www.kshec.kerala.gov.in/images/pdf/Curriculum_Framework_Final_--_10052023.pdf

- *Evaluation Reforms in Higher Educational Institutions*

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- *Evaluation Reforms in Higher Educational Institutions*

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KERALA STATE HIGHER EDUCATION COUNCIL

HANDBOOK FOR MASTER TRAINERS

WITH FOUNDATION COURSES UNDER FYUGP OF KERALA CURRICULUM FRAMEWORK

OCTOBER
2023