Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Curriculum Design and Development, Curriculum Enrichment

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Contents

Preface

The development of an effective curriculum in centurion University is a multi-step, dynamic and follow 360-degree process. The process starts from evaluating the existing curriculum in terms relevance in present context, achieving desired programme objectives and the need of employers/higher education. Curriculum is designed and developed to ensure excellence in the quality in a systematic manner which provides a learner centric education to achieve three specific objectives; **Employment, Higher Education and Entrepreneurship**, as per the following major steps:

Curriculum Framework

- CUTM curricula allows flexibility in course structure, choice-based credits for value-add courses,
  project-based courses, and internships in industry and national labs.
- Choice Based Credit System (CBCS)/elective course system implemented in 100% of the programs.
- University offers 41 Domains across all discipline for students to specialize and get in depth knowledge in a specific area with pre-defined problem statement as a project to deliver.
- Each course has got either of these (Theory / Practice /Project) 3 component
- More than 100 skill courses have been developed and offered to students in each semester and the list of courses get updated in each academic year.
- MOOC, Internship, Minor projects are part of each curriculum for students to take
- Curriculum is aligned to digital platform for learning beyond University curriculum
- More than 80% of the courses have components which enhance employability, entrepreneurship and skills for industry readiness.
- As many as 61 value added courses including yoga and meditation are offered benefiting the students.

Curriculum Development Process
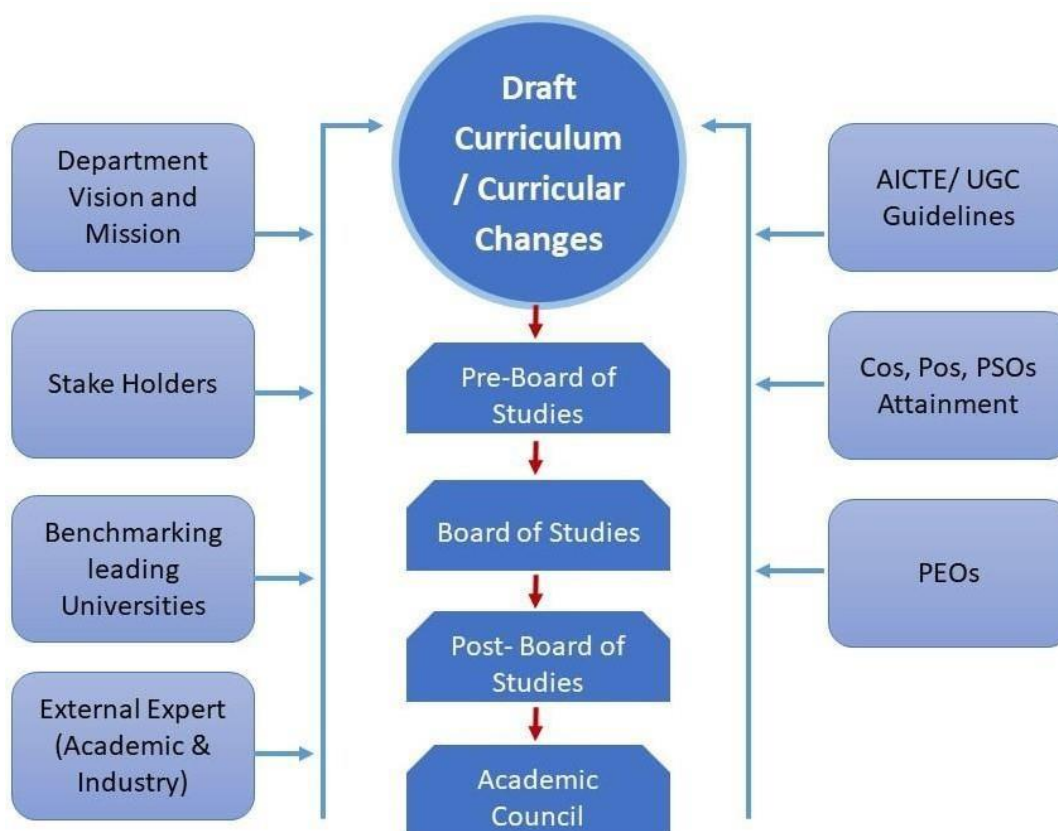
Step-1: Faculty Council prepares the draft curriculum based on the following:

- University Vision and Mission
- Program Educational Objectives
- Feedback collected from stakeholders viz; Recruiters/Industry partners, Alumni, Parents, Academicians, Students
- Conclusions drawn from analysis of attainment of COs, POs and PSOs
- Benchmarking of curriculum against same/ similar program(s) run by leading educational institutions including IITs, NITs, Best Private and Foreign Universities, MOOCs, Digital learning platform and Sector Skill Council.
- Guidelines of AICTE/ UGC/ICAR/PCI

Step-2: Conduct Pre-Board of Studies (Pre-BoS) meeting to discuss the draft curriculum and recommend necessary changes.

Step-3: Conduct Board of Studies (BoS) meeting to finalize the curriculum and syllabi.

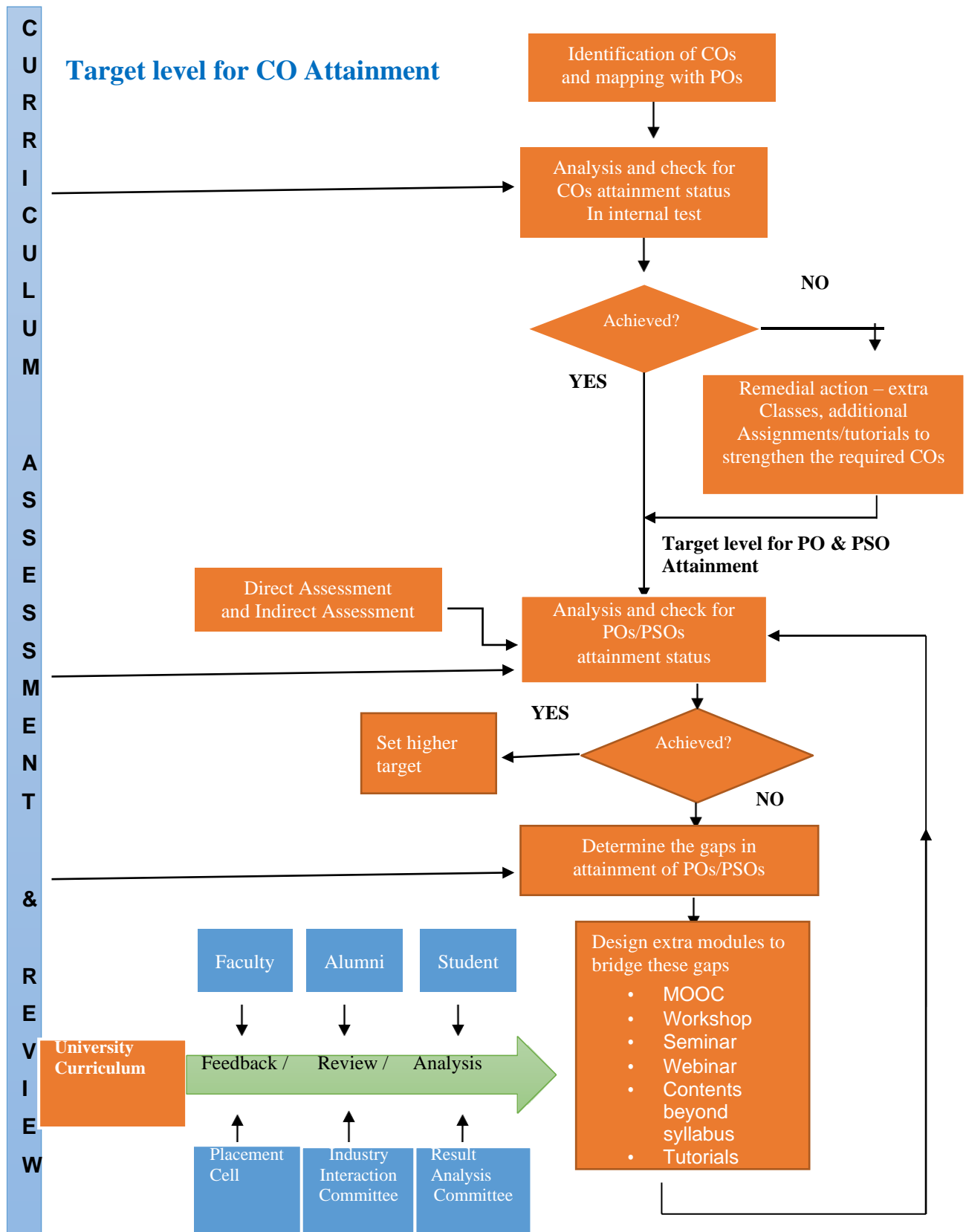Step-4: Hold post BoS meeting to ensure the incorporation in curriculum and syllabi.

Step-5: Submit the final curriculum for approval of Academic Council.

Design of Syllabus, course plan and course materials

Each course structured in the curriculum of a programme, is assigned to faculty to develop syllabus based on feedback received from stakeholder with course objectives and course outcome course outline, practice/project component, text and reference books, online sources evaluation criteria. The syllabus is presented in BoS and Academic Council for discussion and approval respectively. After due approval the course is assigned to faculty to develop session wise course plan and course materials, which is uploaded in courseware.cutm.ac.in for the access of students.

During course delivery students are asked to give feedback on each course registered through ERP in a prescribed format. These reports are accessed by respective Dean of the Schools and then it is shared with concerned faculty with specific remarks/suggestions for improvement in pedagogy etc.

Attainment of COs, PSOs and POS

Target level for CO Attainment

CURRICULUM ASSESSMENT & REVIEW

Identification of COs and mapping with POs

Analysis and check for COs attainment status In internal test

Achieved?

NO

YES

Remedial action – extra Classes, additional Assignments/tutorials to strengthen the required COs

Target level for PO & PSO Attainment

Direct Assessment and Indirect Assessment

Analysis and check for POs/PSOs attainment status

YES

Achieved?

NO

Set higher target

Determine the gaps in attainment of POs/PSOs

Faculty

Alumni

Student

University Curriculum

Feedback / Review / Analysis

Placement Cell

Industry Interaction Committee

Result Analysis Committee

Design extra modules to bridge these gaps
- MOOC
- Workshop
- Seminar
- Webinar
- Contents beyond syllabus
- Tutorials

Attainment of Course Outcomes (COs)

The policy describes a process for systematic evaluation and meeting the Programme objectives, Programme Specific Outcomes and Course outcomes of the Engineering programs at Centurion University of Technology and Management. The course objectives are defined and evaluated for each subject in the curriculum by the faculty on a regular basis to ensure that the program/course outcomes are being met. A group of three or four faculty members are assigned to evaluate each course outcome on a continual basis and their recommendations are used to make course improvements.

The program objectives are in line with the Washington Accord and missions of the University. In addition, Programme Outcomes of each discipline/department of Engineering has been defined to meet the career track viz; **job, higher study, entrepreneurship**. Further eight outcomes have been identified in line with PSOs and POs.

Course Outcomes

Course Outcomes (COs)	Competency/skill
CO1	Knowledge
CO2	Analytical and Creative Thinking
CO3	Problem Solving
CO4	Leadership & Management
CO5	Domain Skill/Competency
CO6	Product/Publication/Patent
CO7	Information Literacy
CO8	Employability skill/ Higher study/ Entrepreneurship

Scale: H: High, M: Medium, L: Low, -: Nil

Note: A course need not have all 8 outcomes.

Written assessment question pattern(suggested)

Question No.	Question pattern	Marks	Course Outcomes

1	Objective question; (Answer any Five out of Seven)
	   I.
	   II.
	   III.
		1-2 marks each	Knowledge

	IV. V. VI. VII.		
2	Short Notes; a) b)	4-5 marks each	Analytical and Creative Thinking
3	Numerical Question	8-10 marks each	Problem Solving
4	Theory question	5-10 marks each	Leadership & Management
5	Application /Domain linked (Higher level in compared to basic course)	8-10 marks each	Domain Competency/Skill
6	Current issues/technology	5 marks each	Information Literacy
7	As applicable	1-2 marks each	Employability skill/ Higher study/ Entrepreneurship

Note: Question paper of a theory course can have multiple questions of same type (Say 1 or more numerical question, 1 or more application question etc.)

Other Assessments

- Assignment can also have specific outcome/s. For Example; Information Literacy can be assessed by giving task to learn from reference book/materials, peers learning, online sources etc.
- Leadership & Management skill can be assessed through group activity/project
- Domain Skill is to be assessed to demonstrate hands-on skill and give output as a product/publication/patent
- Learning Record can be taken as an evidence of key learning about Knowledge, Analytical & Creative Thinking and Practice/Hands-on Skill
- Quiz can test pre-requisite knowledge, employability skill
- Project is assessed, if it delivers a product or publication or patent
- Internship is assessed based on industry exposure that links to domain skill

- Placements linked training undertakes employability test through standard online test viz; AMCAT, COCUBES, AUTOMATA, GATE, NET, JRF etc.
- IELTS test is conducted to test the English Proficiency of students

Outcomes Assessment Process

The Quality Assessment(QA) Cell has identified a set of tools to monitor student progress in achieving the outcomes. The assessment instruments fall into three general categories: audits, surveys, and student performance results. The feedback cycle varies for each of the instruments. While some provide immediate feedback on student progress in achieving the outcomes and allow corrective actions to be made at the beginning of each semester, others require long-term analysis over 2/3 years.

Audits

Several types of audits are identified for assessing program/course outcomes and credit transfer.

a. **Curriculum Audit:** Provides information on how the curriculum contributes to the program outcomes. For example, the Mechanical Engineering graduate student has to develop manufacturing skill and make a product using Conventional or CNC machine. Other instruments, such as surveys and test results, are used to determine whether students are achieving program outcomes. Analysis is an ongoing process and the curriculum will be adjusted when necessary.

b. **Prerequisites:** Advising and enforcement of course prerequisites ensures that the students are taking required courses in the proper sequence. The School has a mentoring system where a faculty is assigned to a group of students to make their individual career plan and guide them to follow specific track leading to Programme Objectives; viz; Job, Higher studies and Self Employment. Students get proper guidance to register courses before beginning of each semester.

Faculty keeps a track of courses registered by his/her mentees and guide them as per their examination performance to choose courses. ERP has a system to check prerequisites has been implemented. At the beginning of each semester, the Mentor check each student record for the required course prerequisites and those lacking the required prerequisites are dropped administratively from the course.

c. **Credit Transfer Audit:** The University has Articulation Committee to do course mapping for lateral entry or transfer of credit.

d. **Course Audit:** This is a short-cycle assessment tool that provides immediate diagnostic feedback. Each course is peer reviewed every semester by a set of faculty assigned to the

course. The reviewing faculty are knowledgeable about the course since they are typically on the teaching rotation for the course. The course audit involves the review of two sets of documents: Question Pattern and Learning Record

e. **Learning Record:** The Learning Record contains key learning, practice and samples of students' work. (Three examples of learning records are collected in the course notebook (one high grade, one average grade and one low grade). This is maintained for the entire course. The reviewing faculty group will review sample learning record and provide feedback on topic coverage and on whether the course objectives are being met.

f. **Evaluation methods and Question pattern:** Each course has got specific evaluation methods defined based on course type(Theory/Practice/Project). The question pattern and assignments tries to link the specific outcomes to measure.

g. **Course Feedback:** A structure feedback is taken for each course at the end of semester to understand the extent of course delivery, pedagogy, course coverage etc. and it is shared to the concerned faculty to improve the quality of teaching.

h. **Student Exit Survey:** A survey is conducted at the end of programme to assess the opinions of graduating students on their success in achieving program outcomes and on their attitudes toward the department. Students had a choice of ranking each item in the questionnaire as: Excellent = 5, Good = 4, Average = 3, Poor = 2, Can't Rate =1. The results of this survey are analysed and report is discussed in Board of Studies(BoS)/Academic Council for necessary action.

i. **Alumni and Employers Survey:** Online and Offline Survey instruments have been developed to obtain input from such major constituencies as alumni and employers. But mostly the focus group discussion is conducted during Alumni meet or visit to the University for an effective discussion and input. The survey results are analysed by BoS and Academic Council and take necessary measures.

Feedback and analysis

The feedback received from various stake holders are analysed, discussed and specific action plans are developed for continuous improvement in the curriculum, pedagogy and meeting learning outcome of each course/programme as a whole in line with future goal of students to achieve three specific objectives; Employment, Higher Education and Entrepreneurship

Procedure for attaining COs, POs and PEOs

> ➢ **Evaluation of Course Outcome**

Each courses are defined with course type (Theory+Practice+Project), that define the pedagogy to use and have well-defined COs, attainment of which are assessed using a combination of direct and indirect methods.

A) Direct Assessment: Two major components:

  1. Internal Evaluation 1 & 2 and Continuous Evaluation (CE) (Assignments, Quizzes, Class Tests, Laboratory performance, Projects, Presentations)

  2. End Semester Examination (ESE).

Setting targets for performance attainment: The measurement is through a direct assessment method and is based on the attainment of 60% marks or 6gp on a 10 point grade scale) or more as the threshold.

  Level 3: > 60% of students scoring more than 6 GP
  Level 2: 40% to 60% of students scoring more than 6 GP
  Level 1: < 40% of students scoring more than 6 GP

Note: If target level of attainment is achieved in current year, threshold is increased for next year. Moreover, different thresholds may be set for different level as well as differences courses.

B) Indirect Assessment: Indirect method of assessment of COs is based on course feedback performed at the end of the semester.

Indirect assessment of COs is performed using course feedback conducted at the end of the semester. Students are asked to rate course on a scale of 5. The components of COs attainment are set based on the attainment of a threshold of 4 points or more.

  Level 3: > 4 score
  Level 2: Between 3 to 4 score
  Level 1: < 3

Target Attainment Calculation

> Direct Attainment (DA) = External Assessment+ Internal Assessment Indirect
>
> Attainment (IA) = Course Feedback
>
> Total Attainment = DA * 0.8 + IA * 0.2
>
> **Target Attainment Level = 2.4 (80% of highest level 3)**

➢ **CO-PO Mapping:**

Each Course outcome will be mapped to one or more suitable POs

➢ **Procedure for attainment of POs:**

Program outcomes will be attained through direct and indirect methods.

A. **Direct Attainment:** We will consider all the courses which are mapped to a particular PO.

Then the direct attainment value will be calculated based on the following formula:

Direct PO Attainment = Sum of the average attainment level of course outcomes (COi) mapped to a POi / Total number of courses

B. **Indirect Attainment:** In this method, we consider the feedbacks of Recruiters, students, alumni and parents on the framed questionnaires.

Final PO attainment= 80% of Direct attainment + 20% Indirect attainment

The following table shows the five target levels:

Level of PO attainment range

Level	PO Attainment range
1 (Poor)	0.5<=PO attainment value<1.5
2 (Average)	1.5<=PO attainment value<2
3 (Good)	2<=PO attainment value<2.5
4 (Very Good)	2.5<=PO attainment value<2.75
5 (Excellent)	2.75<=PO attainment value<=3

Target levels for attainment of POs/PEOs will be set based on the performance of the previous year.

Same procedure will be used for obtaining attainment of PEOs.

➢ **Procedure for attainment of PEOs:**

We map POs with suitable PEOs.

Direct attainment of PEO= sum of average attainment of POS mapped to a PEO / total number of POs

Indirect attainment of PEOs is based on the feedbacks of students, parents, alumni and parents on the framed questionnaires.

Final PEO attainment= 80% of Direct attainment + 20% Indirect attainment

Centurion University of Technology and Management

Odisha