

# INDUSTRY RELEVANT CURRICULUM DESIGN PROCESS



Dr.V.Thanikachalam




# Current needs of Industries in India

- World class production of goods and services
- High quality labor at lower cost
- Dependability, maintainability, and reliability
- Innovative products for global needs
- Cost effective production process
- Multi - skilled workers



# Role of engineering colleges

- Human capital supplier
- Engineers
- Technologists
- Managers
- Architects
- Software developers



# Additional role of engineering colleges

- Knowledge capital developers
- New products ( improved manufacturing services, patented design)
- New services ( Consultancy programs, HRD)
- Innovators
- Sponsored Research and Developments



# Approaches for curriculum development

- Consortium approach
- Networking of colleges, universities, national research and development labs.
- Networking of industries
- Students career goals
- Commitment to the sector



# Process of developing industry relevant/ specific curriculum

- Based on needs analysis of the industries
- Objectives are based on needs ( jobs, tasks)
- Needs are identified based on the industries' activities ( present and near future) and personnel competencies to meet performance standards and targets.



# Dynamic changes in the industries

- Product changes
- Process changes
- New technology/ Improved changes
- Changes in laws, rules, and regulations
- Scarcity of raw materials
- Demand for newer goods/services



# Courses

- Sequence of content units arranged
- A judiciously organized subject matter
- Organized set of processes, procedures, programs and alike which are applied to learners in order to achieve specified objectives.





# Curriculum

- A systematic group of courses required for graduation
- A general overall plan of the content or a specific materials of instruction offered for graduation
- A body of prescribed educative experience under college supervision
- Designed to provide an individual with the best possible training



# Competencies

- Problem solving
- Total quality management
- Communication
- Commitment
- Risk taking ability
- Human resource managing skills
- Innovations
- Multi-skilled architects ,engineers , managers and technologists



# Factors to be taken

- Entering behavior of the students
- Technological changes in the industry
- Legal changes
- Increasing number of students entering into the system
- Instructional methods
- Integration of courses of study
- Learning materials
- Changes in emphasis needed by social system



# Syllabus

- Drafted by a nominated group of faculty (Board of Studies)
- Approved by an Academic Council / Senate / syndicate of an university
- Lists the Courses of Study
- Contents and Time Allocation
- Allocates marks
- Prescribes standards of graduation
- Reference Books



# Rules and regulations

- Minimum marks required for a pass / class
- Attendance required
- Number of courses / credits required
- Training required



# Problems

- Depth of coverage not specified
- Participation of stake holders – NIL / negligible
- Less flexible



# Systems approach

- System is defined as set of interrelated parts, working independently and jointly , in pursuit of common objectives of the whole , within a complex environment.



# Use of system approach for curriculum development

- Systematic process of identifying the needs of the employers, prescribing standards of achievement, incorporating the students career goals
- Incorporating flexibility
- Providing electives
- Credit based





# System

- Inputs
- Conversion process
- Output
- Outcome
- Internal feedback
- External feedback



# Outcome

- Benefits/ results / foreign exchange reserve
- Successful production and export to other countries
- Hub for export
- Profits / taxes paid / world market share
- Services to the global industries
- Global technology leadership / service
- Continuous improvement in the products / services



# Output

- Technicians
- Skilled workers
- Architects
- Engineers
- Managers
- Software Professionals
- Services to the Society(State,Regional, National and Global)
- Industrial Products
- Patented Services



# Processes

- Conversion process (student development)
- Teaching
- Training
- Evaluating
- Development of creative professional competencies



# Input

- Funds / grants-in-aid , fees , donations
- Resources (equipment , books, software, consumables)
- Infrastructure (Building, land, transport, electricity, LPG)
- Expertise (Faculty, staff)
- Guidelines /policies
- Human resources



# Feedback -internal

- Questionnaire
- Oral
- Discussion
- Records
- Observation
- Achievements



# Feedback- external

- Evaluation Committee's reports
- Public opinion
- Reports in Mass media
- Employer's feedback
- QUESTIONS raised in the parliament



# Curriculum based on needs analysis

- Job analysis
- Performance analysis
- Potential analysis
- Duties
- Task analysis
- Competencies
- Key performance areas





# Job

- A position which is available in an industry/organization to be employed.
- A person is either employed on a job by virtue of his/her qualification and experience
- Or is trained by industry to fit into the job position available.



# Duty

- A person employed in an industry to a specific job specification is expected to do several duties as requirement of the job.
- These are identifiable discrete activities done by the employee.



# Job analysis

- Process of examining a job
- Job consists of a large number of duties
- Results in a set of tasks to be performed



# Job synthesis

- Future jobs
- Based on the technology trends
- Based on the leadership
- Job potential



# Task analysis

- A set of tasks involved in each job.
- A task involves a set of steps through which performance is completed.
- Performance objectives describe the standards of achieving the task



# Learning task analysis

- Internal sequence of progress
- Learning required
- Information , standards , properties, specifications
- Discrimination
- Concepts/ concrete
- Concepts/ defined
- Rules , derivations, thumb rules analytical methods, software...



# Higher order rules

- Design principles, model analysis,
- Design standards
- Design practices
- Creative design process



# Cognitive strategies

- Innovative solutions
- Maintenance free products
- Economical solutions
- Value improved products
- Compact products





# Performance evaluation of employees

- Evaluation of performance of an employee
- Based on the detailed instruments prepared
- The HR/IR departments prepare the instruments in consultation with line management
- Standards of performance are specified by the organization
- Standards are form the industry or in house best practices



# Performance appraisal

- Evaluation of the employee's performance
- Based on records
- Observation
- Achievement
- Innovative practices adopted
- Appraisal is done at periodical intervals
- Discussed with the employee.



# Utility of performance appraisal

- Identification of causes for discrepancies/poor performance
- Additional training required
- Planning for conducive environment
- Development of job-aids
- Development and orientation to operation and maintenance manuals
- Improvements in workplace ergonomics



# Rewards based on the performance

- Financial rewards
- Job enrichments
- Job enlargements
- Letters of appreciation
- Publication in the in-house journal



# Potential appraisal

To identify the additional competencies

- To match new jobs available
- Post to appropriate units/branches/centers
- To utilize the extra talents



# Curriculum based on national policies

- Finance : funds, grants, loans, donations, fees.
- Years of education
- Minimum credits required
- Teacher / student ratio
- Regulations of national councils
- Industrial/societal demands
- Courses of study based on the law/rules/regulations



# Flexible curriculum

- Courses :Core/Applied/Advanced/Electives
- Maximum Duration
- Dual degree
- Integrated programs
- Credit transfer
- Individual studies



# In-house Curriculum Development Process

- Professional department/center/cell
- Professional staff
- Resources
- Delegation
- Infrastructure
- Participation of stake holders





# Problems

- Changes in government policy
- Unavailability /shortage of professional staff
- Resource crunch
- Shortage of infrastructure
- Rapid changes in the human resource requirement



# Changes in the government policy

- Funds distribution
- New restrictions in the Payment of grants-in-aid
- Changes in the priority sectors of education
- Changes in the emphasize in the programs (Certificate / diploma / degree / post graduate diploma / post graduate degree)



# Changes ...

- B.E (5 years to 4 years)
- M.E / M.Tech ( One year to two years to three semesters to two years)
- Integrated M.E / M.Tech – five years
- Flexible credit based programmes
- Interdisciplinary programmes



# Critical factors

- Rapid changes in job potential
- Job-shifts
- Government policies with respect to public sector
- Private sector (S/ M /E)
- Entrepreneurship
- Overseas jobs
- Global industries
- Demand for the Indian professionals



## Critical factors-contd.

- Rapid changes in the competencies
- Ultimate objectives
- Scientific developments in contents
- Modernization of delivery system
- Shortage of faculty

# CURRICULUM DEVELOPMENT CENTERS



INSTITUTE BASED  
DEVELOPMENT PROGRAM



# Curriculum Development Centers

- A dedicated center
- For technical education
- A part of I.I.Network
- Networked with all other institutions, organizations, stake holders
- Infrastructure for developing projects
- Resources and resource persons



# Goals

- Targets for various sectors
- Programmes
- Participation of stakeholders
- Identification of competencies
- Well defined objectives
- Programs confirming to National / International norms





# Program planning

- Systems approach
- Needs analysis
- Involvement of stake holders
- Complete exploration of job potential
- Identification of competencies for various spectrum of employees



# Budgeting

- Funds estimation
- Resource persons' expenditure
- Conduct of meeting
- Printing ,telephone,post,fax
- Value analysis
- Draft curriculum



# Formative evaluation

- Views of experts
- Comments from employers
- Feedback from the teachers
- Commitment of the administrators
- Evaluation of the infrastructure
- Evaluation of resources
- Evaluation of faculty



# Piloting

- Implementation in one or two institutions
- Monitoring the activities and progress
- Mid corrections
- Checking on the assumptions made
- Hidden problems
- Bottlenecks
- Constraints



# Resource mobilization

- Capital expenditure for facilities
- Recurring expenditure for teachers salary
- Books, journals, equipment, consumables
- Development of learning resources
- Maintenance of tools, instruments, and equipment



# Orientation to new curriculum

- Public opinion
- Teachers development
- Educational administrators
- Marketing of the programs
- Brochures
- Mass media



# Staff/faculty development

- Content updating
- Industrial/field training
- Instructional methods
- Measure and Evaluation systems



# Development of instructional resources

- Learning packages
- Text books
- Workshop manuals
- Laboratory manuals
- Drawing manuals
- Item banks






# Follow up of Piloting

- Feedback on implementation in one or two institutions
- Reports on monitoring the implementation
- Corrections and revision
- Improvement in the curriculum
- Improvement in the learning packages
- Mass production of learning packages



# Implementation

- State
- National level
- Periodic evaluation
- Revision /modernization



# Periodic Evaluation of the Curriculum

- Context Evaluation (Economics / human resource requirements / global leadership)
- Input Evaluation (funds, resources , infrastructure, consumable)
- Process Evaluation (teaching –learning- measurement-placement)
- Product Evaluation



# Continuous improvement

- Programmes
- Processes
- Networking
- Web-based / on-line programmes
- Flexible programmes



No End at all



# Lifelong learning

Leading to Institutional  
Development