



CITY ENGINEERING COLLEGE

Approved by AICTE New Delhi & Affiliated by VTU, Belagavi
Doddakallasandra, Off Kanakapura Main Road,
Next to Gokulam Apartment, Bangalore - 560 062.



DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

2.6.1 OUTCOME BASED EDUCATION PROCESS

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by establishing a correlation between the courses and the Program Outcomes (PO's) and Program Specific Outcomes (PSO's). Outcome-based accreditation – the focus remains on the evaluation of outcomes of the program, though Input and Output parameters are also important. Globalization has brought in a clear shift from education to the transmission of expert knowledge competencies including learning to learn and lifelong learning.

Program Outcomes: PO's are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability, attitude, and behavior that students acquire through the program. The POs essentially indicate what the students have attained through the curriculum, assessment, and evaluation during the program. As such, PO's define the professional profile of an engineering graduate. NBA has defined the following twelve PO's for an engineering graduate.

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Course Outcomes (COs): Course Outcomes are narrower statements that describe what students are expected to know, and can do at the end of each course. These relate to the skills, knowledge, and behavior that students acquire in their progress through the course. The procedure for attainment for CO's and PO's and PSO's is explained in detail. The targets for various attainments are fixed and the attainment levels of students are checked batch-wise. These achievement levels further become inputs for gap analysis. Once the gaps are identified and analyzed corrective actions are planned for gap improvement. So, this is a continuous process of achievement for OBE.

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Correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSO's)

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A. PROGRAM OUTCOMES :(PO's)

PO's are statements about the knowledge, skills, and attitudes (attributes) the graduate of a formal engineering program should have. POs deal with the general aspect of graduation for a particular program and the competencies and expertise a graduate will possess after completion of the program.

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identity, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply to reason informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. PROGRAM SPECIFIC OUTCOMES (PSO's)

Professional Skills: Apply the concepts in core area of Artificial Intelligence and Machine Learning –to solve futuristic problems.

Problem-Solving Skills: Develop automated solutions for real world problems through laboratory experiments, projects and internship.

Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

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Department of Civil Engineering

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PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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B. PROGRAM SPECIFIC OUTCOMES (PSO's) (Civil Engineering)

PSO's are, what the students should be able to do at the time of graduation. The PSO's are program specific. PSO's are written by the department offering the program. There are usually two to four PSO's for a department.

The following are the PSOs of the Department of Civil Engineering:

Upon graduation students will be able to:

- **PSO1:** Imparting knowledge in Civil Engineering for in Analysis and Design of Structural systems and Sub-structures in a Sustainable and Eco-friendly manner.
- **PSO2:** Infuse clarity and understanding of the basic principles of various subjects of Civil Engineering vis-à-vis skill development such as software tools, design and sustainable construction practices enabled by Industry Institute Interaction.
- **PSO3:** Develop Professional Ethics, Leadership, People's skill, Continuous Learning process addressing societal needs and lifelong learning.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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The following are the PSOs of the Department of Computer Science and Engineering:

Upon graduation students will be able to:

- **PSO1:** Ability to understand, Analyze and implement programs in programming languages, as well apply concepts in core areas of Computer Science
- **PSO2:** Ability to use Computational skills in Mathematics, Algorithms and apply software knowledge to develop projects based on architecture of the system, data analysis to solve Real world problems.
- **PSO3:** Ability to participate in Teams and use computer knowledge in various domains to become successful Entrepreneur.

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B. PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO's are, what the students should be able to do at the time of graduation. The PSO's are program specific. PSO's are written by the department offering the program. There are usually two to four PSO's for a department.

The following are the PSOs of the Department of Electronics and Communication Engineering:

Upon graduation students will be able to:

- **PSO1:** Analyze and Design analog & digital circuits of systems. Implement functional blocks of hardware-software co-designs for signal processing and communication applications.
- **PSO2:** Work with respect for societal values and concern for environment in implementing engineering solutions.

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DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

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PO12.Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. PROGRAM SPECIFIC OUTCOMES (PSOs)(INFORMATION SCIENCE AND ENGINEERING)

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The following are the PSOs of the Department of Information Science and Engineering:

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- **PSO1:** Ability to understand, Analyze and implement programs in programming languages, as well apply concepts in core areas of Computer Science
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Program Specific Outcomes PSOs: are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program. Programs may specify 2-4 program-specific outcomes. These are the statements, which are specific to the particular program. They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs.

Course Outcomes (COs): Course Outcomes are narrower statements that describe what students are expected to know, and can do at the end of each course. These relate to the skills, knowledge, and behavior that students acquire in their progress through the course. The procedure for attainment for COs and POs and PSOs is explained in detail. The targets for various attainments are fixed and the attainment levels of students are checked batch-wise. These achievement levels further become inputs for gap analysis. Once the gaps are identified and analyzed corrective actions are planned for gap improvement. So this is a continuous process of achievement for OBE.

Correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by Establishing a correlation between the courses with the Program Outcomes (POs) and Program Specific Outcomes (PSOs).

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A. PROGRAM OUTCOMES :(Po's)

Graduation students of Bachelor of Mechanical Engineering program at City Engineering College attain the following program outcomes in the field of mechanical engineering..

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identity, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply to reason informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES:

The graduates of Mechanical engineering program of City Engineering College should be able to attain the following at the time of graduation.

PSO1 Expertise in specialized areas of Mechanical Engineering such as Design, Thermal, Materials and Manufacturing Engineering with a focus on research and innovation.

PSO2 Ability of problem solving by adopting analytical, numerical and experimental skills with awareness of societal impact for mechanical engineering.

PSO3 Apply modern Engineering tools and managerial skills to develop products in Mechanical and its allied Engineering fields.

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DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES

2.6.1 OUTCOME BASED EDUCATION PROCESS

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by establishing a correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs). Outcome-based accreditation – the focus remains on the evaluation of outcomes of the program, though Input and Output parameters are also important. Globalization has brought in a clear shift from education to the transmission of expert knowledge competencies including learning to learn and lifelong learning.

Program Outcomes: POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability, attitude, and behavior that students acquire through the program. The POs essentially indicate what the students have attained through the curriculum, assessment, and evaluation during the program. As such, POs define the professional profile of an engineering graduate. NBA has defined the following twelve POs for an engineering graduate.

Program Specific Outcomes PSOs: are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program. Programs may specify 2-4 program-specific outcomes. These are the statements, which are specific to the particular program. They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs.

Course Outcomes (COs): Course Outcomes are narrower statements that describe what students are expected to know, and can do at the end of each course. These relate to the skills, knowledge, and behavior that students acquire in their progress through the course. The procedure for attainment for COs and POs and PSOs is explained in detail. The targets for various attainments are fixed and the attainment levels of students are checked batch-wise. These achievement levels further become inputs for gap analysis. Once the gaps are identified and analyzed corrective actions are planned for gap improvement. So, this is a continuous process of achievement for OBE.

Correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by Establishing a correlation between the courses with the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

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A. PROGRAM OUTCOMES :(Po's)

Po's are statements about the knowledge, skills, and attitudes (attributes) the graduate of a formal engineering program should have. POs deal with the general aspect of graduation for a particular program and the competencies and expertise a graduate will possess after completion of the program.

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identity, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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PO12.Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. PROGRAM SPECIFIC OUTCOMES (PSOs) (APPLIED SCIENCE AND HUMANITIES)

PSOs are, what the students should be able to do at the time of graduation. The PSOs are program specific. PSOs are written by the department offering the program. There are usually two to four PSOs for a department.

The following are the PSOs of the Department of Applied Science and Humanities:

Upon graduation students will be able to:

- **PSO1:** Develop the ability to understand, demonstrate, identify, analyze and apply the skills and knowledge gained from foundational courses of humanities, sciences and engineering, and relate these fundamentals with core subjects in the relevant field.
- **PSO2:** Understand basic skills and principles of engineering by developing and engaging them in life-long learning with effective skills, inculcating quality of reasoning, logic, analysis and communication.
- **PSO3:** Cultivate the ability to work in teams and learn by participating in technical events and social welfare programs and develop the attitude for working productively as an individual and in cross-disciplinary teams to become better citizens in the multicultural world.

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DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

2.6.1 OUTCOME BASED EDUCATION PROCESS

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by establishing a correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs). Outcome-based accreditation – the focus remains on the evaluation of outcomes of the program, though Input and Output parameters are also important. Globalization has brought in a clear shift from education to the transmission of expert knowledge competencies including learning to learn and lifelong learning.

Program Outcomes: POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability, attitude, and behavior that students acquire through the program. The POs essentially indicate what the students have attained through the curriculum, assessment, and evaluation during the program. As such, POs define the professional profile of an engineering graduate. NBA has defined the following twelve POs for an engineering graduate.

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Correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Outcome-based education is student-centered instruction that focuses on measuring student performance i.e., outcomes. Outcomes include knowledge, skills, and attitudes. This can be achieved by Establishing a correlation between the courses with the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

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A. PROGRAM OUTCOMES :(Po's)

Po's are statements about the knowledge, skills, and attitudes (attributes) the graduate of a formal engineering program should have. POs deal with the general aspect of graduation for a particular program and the competencies and expertise a graduate will possess after completion of the program.

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and computer science and business systems to the solution of complex engineering and societal problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering and business problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply to reason informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. PROGRAM SPECIFIC OUTCOMES (PSOs)(INFORMATION SCIENCE AND ENGINEERING)

PSOs are, what the students should be able to do at the time of graduation. The PSOs are program specific. PSOs are written by the department offering the program. There are usually two to four PSOs for a department.

The following are the PSOs of the Department of Master of Computer Applications:

Upon graduation students will be able to:

PSO1: Understand and apply the computing techniques with mathematics and industrial concepts for solving the real time industrial problems.

PSO2: Analyze, design, develop, test and maintain the software applications with latest computing tools and technologies.

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DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

- MBA is a two-year full-time programme, aimed at nurturing and training young minds with contemporary skills of management, adopt in handling diverse sectors of the economy.
- The programme intends to inculcate leadership qualities in individuals to strategically position themselves in all emerging platforms of idea generation, creation of pragmatic knowledge, skills and competency development.
- The diverse course curriculum enables a high degree of academic flexibility for fostering innovation and creativity. It instils resilience and adaptability in students for facing the challenges of the contemporary business world.

PROGRAM OUTCOMES

1. Apply knowledge of management theories and practices to solve business problems.
2. Foster analytical and critical thinking abilities for data-based decision making.
3. Ability to develop value-based leadership.
4. Ability to understand, analyses and communicate global, economic, legal and ethical aspects of business.
5. Ability to lead themselves and others in the achievement of organizational goals contributing effectively to a team environment.

PROGRAM SPECIFIC OUTCOMES (PSOs):

The post graduate students of the department shall be able to

PSO1) Comprehend the contemporary features and characteristics of Business Management Science and its administration

PSO2) Analyze and interpret the dynamic situations for making Business Management strategies and decisions at the national and global level

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PSO3) Handle responsibility with the ethical values for all actions undertaken by them.

PSO4) Adapt and focus on achieving the organizational goal and objectives with complete zeal and commitment.

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