

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING DEVELOPMENT, ADVANCED CERTIFICATE

College(s): DA*, TR*, WR

Program Code: 0491

This Advance Certificate serves as a gateway to sustainable careers in Artificial Intelligence and Machine Learning for students new to the field. The Program is an introduction to computer technology and is structured to provide students with the skills necessary to excel in the rapidly field of Artificial Intelligence and Machine Learning Development. This comprehensive program covers multiple topics including Programming fundamentals, basic networking, introduction to AI, Operating Systems, Databases, Machine Learning and Ethics. Students will engage in both theoretical and hands-on learning, preparing them for a variety of roles in the IT industry. The curriculum is organized to provide a deep understanding of Artificial Intelligence and machine learning.

Program Requirements

Code	Title	Hours
General Education Coursework		
MATH 125	Introductory Statistics	4
Required Program Core		
CIS 111	Computer Operations	3
CIS 116	Operating System I	3
CIS 124	Introduction to Cloud Computing	3
CIS 125	Introduction to Artificial Intelligence	3
CIS 146	Python Programming I	3
CIS 205	Machine Learning Essentials	3
CIS 225	Ethics in Information Technology	3
COMPSFI 101	Networking Essentials	3
NET TEC 101	Client-Server Database I	3
Total Hours		31

Pathway

This is an **example course sequence** for students interested in pursuing Artificial Intelligence and Machine Learning Development. It does not represent a contract, nor does it guarantee course availability. If this pathway is followed as outlined, you will earn an Advanced Certificate (AC) in Artificial Intelligence and Machine Learning Development.

Semester-by-Semester Program Plan for Full-Time Students

All plans can be modified to fit the needs of part-time students by adding more semesters.

Semester 1	Hours
CIS 111 Computer Operations	3
CIS 125 Introduction to Artificial Intelligence	3
COMPSFI 101 Networking Essentials	3

MATH 125	Introductory Statistics	4
Hours		13
Semester 2		
CIS 116	Operating System I	3
CIS 124	Introduction to Cloud Computing	3
CIS 146	Python Programming I	3
NET TEC 101	Client-Server Database I	3
Hours		12
Semester 3		
CIS 205	Machine Learning Essentials	3
CIS 225	Ethics in Information Technology	3
Hours		6
Total Hours		31

Choose your courses with your College Advisor.

Careers

This program can prepare students for the jobs listed below. Click on each one to learn more, including average earnings, annual job openings, and how much education people in that field have. For additional guidance and resources on career options, current City Colleges students and alumni can contact the Career Services Office (<https://www.ccc.edu/departments/Pages/Career-Services.aspx>).

Business Intelligence Analysts

Job Description

Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.

Salary Based on Experience Level

Take a look at the average hourly/annual earnings for this career in Cook County

Lightcast earnings figures are based on OES data from the BLS and include base rate, cost of living allowances, guaranteed pay, hazardous-duty pay, incentive pay (including commissions and bonuses), on-call pay, and tips.

Annual Wages

Entry-Level 10 th Percentile	\$72,642
Median 50 th Percentile	\$112,019
Senior-Level 90 th Percentile	\$178,709

Hourly Wages

Entry-Level 10 th Percentile	\$35
Median 50 th Percentile	\$54
Senior-Level 90 th Percentile	\$86

Annual Job Openings

411 annual openings in Cook County

National Education Attainment

Here, you can see the level of education that people in this career complete.

Degree Program	% of Jobs
A high school diploma or less	0.00%
A certificate	0.00%
Some college	0.00%
An Associate degree	4.55%
A Bachelor's degree	72.73%
A Master's or Professional degree	22.73%
A Doctoral degree or more	0.00%

95.46% continue their education beyond an associate degree

Computer Systems Analysts

Job Description

Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.

Salary Based on Experience Level

Take a look at the average hourly/annual earnings for this career in Cook County

Lightcast earnings figures are based on OES data from the BLS and include base rate, cost of living allowances, guaranteed pay, hazardous-duty pay, incentive pay (including commissions and bonuses), on-call pay, and tips.

Annual Wages

Entry-Level 10 th Percentile	\$64,002
Median 50 th Percentile	\$108,192
Senior-Level 90 th Percentile	\$160,579

Hourly Wages

Entry-Level 10 th Percentile	\$31
Median 50 th Percentile	\$52
Senior-Level 90 th Percentile	\$77

Annual Job Openings

510 annual openings in Cook County

National Education Attainment

Here, you can see the level of education that people in this career complete.

Degree Program	% of Jobs
A high school diploma or less	0.77%
A certificate	0.54%
Some college	4.62%
An Associate degree	50.71%
A Bachelor's degree	41.93%
A Master's or Professional degree	1.42%
A Doctoral degree or more	0.00%

43.35% continue their education beyond an associate degree

Computer Programmers

Job Description

Create, modify, and test the code and scripts that allow computer applications to run. Work from specifications drawn up by software and web developers or other individuals. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.

Salary Based on Experience Level

Take a look at the average hourly/annual earnings for this career in Cook County

Lightcast earnings figures are based on OES data from the BLS and include base rate, cost of living allowances, guaranteed pay, hazardous-duty pay, incentive pay (including commissions and bonuses), on-call pay, and tips.

Annual Wages

Entry-Level 10 th Percentile	\$50,145
Median 50 th Percentile	\$84,310
Senior-Level 90 th Percentile	\$176,243

Hourly Wages

Entry-Level 10 th Percentile	\$24
Median 50 th Percentile	\$41
Senior-Level 90 th Percentile	\$85

Annual Job Openings

40 annual openings in Cook County

National Education Attainment

Here, you can see the level of education that people in this career complete.

Degree Program	% of Jobs
A high school diploma or less	0.00%
A certificate	0.00%
Some college	2.52%
An Associate degree	8.99%
A Bachelor's degree	88.04%
A Master's or Professional degree	0.45%
A Doctoral degree or more	0.00%

88.49% continue their education beyond an associate degree

Database Architects

Job Description

Design strategies for enterprise databases, data warehouse systems, and multidimensional networks. Set standards for database operations, programming, query processes, and security. Model, design, and construct large relational databases or data warehouses. Create and optimize data models for warehouse infrastructure and workflow. Integrate new systems with existing warehouse structure and refine system performance and functionality.

Salary Based on Experience Level

Take a look at the average hourly/annual earnings for this career in Cook County

Lightcast earnings figures are based on OES data from the BLS and include base rate, cost of living allowances, guaranteed pay, hazardous-duty pay, incentive pay (including commissions and bonuses), on-call pay, and tips.

Annual Wages	
Entry-Level 10 th Percentile	\$104,350
Median 50 th Percentile	\$154,350
Senior-Level 90 th Percentile	\$211,292

Hourly Wages	
Entry-Level 10 th Percentile	\$50
Median 50 th Percentile	\$74
Senior-Level 90 th Percentile	\$102

Annual Job Openings

48 annual openings in Cook County

National Education Attainment

Here, you can see the level of education that people in this career complete.

Degree Program	% of Jobs
A high school diploma or less	0.00%
A certificate	4.76%
Some college	0.00%
An Associate degree	0.00%
A Bachelor's degree	80.95%
A Master's or Professional degree	14.29%
A Doctoral degree or more	0.00%

95.24% continue their education beyond an associate degree

Software Developers

Job Description

Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance

existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.

Salary Based on Experience Level

Take a look at the average hourly/annual earnings for this career in Cook County

Lightcast earnings figures are based on OES data from the BLS and include base rate, cost of living allowances, guaranteed pay, hazardous-duty pay, incentive pay (including commissions and bonuses), on-call pay, and tips.

Annual Wages	
Entry-Level 10 th Percentile	\$87,563
Median 50 th Percentile	\$142,987
Senior-Level 90 th Percentile	\$217,902

Hourly Wages	
Entry-Level 10 th Percentile	\$42
Median 50 th Percentile	\$69
Senior-Level 90 th Percentile	\$105

Annual Job Openings

1469 annual openings in Cook County

National Education Attainment

Here, you can see the level of education that people in this career complete.

Degree Program	% of Jobs
A high school diploma or less	3.13%
A certificate	1.67%
Some college	0.00%
An Associate degree	5.07%
A Bachelor's degree	85.61%
A Master's or Professional degree	4.52%
A Doctoral degree or more	0.00%

90.13% continue their education beyond an associate degree