UC San Diego
EXTENDED STUDIES

Data Mining for Advanced Analytics

Specialized Certificate

Data Mining, Defined

Data mining, also known as predictive analytics or data analytics, is a process that uses a variety of data analysis and machine learning tools to discover patterns and relationships in data that may be used to make predictions. Predictive analytics has become a fundamental component of all facets of business, commerce, and scientific discovery.

Data Mining in Action

Predictive analytics is an interdisciplinary field, used in a variety of industries, from business to surveillance, from science and engineering to music, from health sciences to insurance. Some application areas include bioinformatics, business intelligence, fraud detection, customer intelligence, marketing, surveillance, drug discovery, and social networking.

Program Overview

Newly updated with added data sets, a robust practicum course, a survey of popular data mining tools, and additional algorithms, this program equips students with the skills to make data-driven decisions in any industry. You will begin by learning foundational data analysis and machine learning techniques for model and knowledge creation. Then you will take a deep-dive into the crucial step of cleaning, filtering, and preparing the data for mining and predictive or descriptive modeling.

Building upon the skills learned in the previous courses, you will then learn advanced models, machine learning algorithms, methods, and applications. In the practicum course, you will use real-life data sets from various industries to complete data mining projects, planning and executing all the steps of data preparation, analysis, learning and modeling, and identifying the predictive/descriptive model that produces the best evaluation scores. Electives allow you to learn additional high-demand techniques, tools, and languages.

Program Benefits

- Practical, hands-on comprehensive training
- All courses are taught online for flexibility
- Taught by leading industry practitioners
- Program can be completed in only one year
- Industry-neutral curriculum allows students to apply knowledge to their field of interest

Key Program Topics

- Decision tables and trees
- Classification and association rules
- Bayesian learning
- Numeric prediction
- Clustering
- Ensemble learning
- Artificial neural networks
- Hidden Markov models
- Support vector machines

Program Details

Prerequisites

Knowledge of statistics is required prior to beginning required program courses. This prerequisite can be fulfilled by taking Statistics for Data Analytics, which is designed specifically to prepare students for this program, or another of our statistics course offerings. We also recommend that you have knowledge of probability theory and linear algebra, but this is not required.

If you work with statistics, probability theory, and/or linear algebra in the course of your current employment or have completed a similar course previously, you may waive the Statistics for Data Analytics prerequisite, and begin the program directly with Fundamentals of Data Science. Attached at the end of this document is a short self-assessment quiz to help you gauge whether or not you should forego the prerequisite.

Requirements

There are four required courses and one elective required for completion of the Data Mining for Advanced Analytics program. You must take the program courses in the order listed in the chart below, which shows when and in what format courses are offered.

Course Title	Course No.	Units	Course Offered			
			Fall	Winter	Spring	Summer
Prerequisite Course (Below course or equivalent experience required.)						
Statistics for Data Analytics	CSE-41264	3.0	Online	Online	Online	Online
Required Courses (All four courses required and should be taken in the order listed below.)						
Fundamentals of Data Science	CSE-41258	3.0	Online		Online	
Data Preparation for Analytics	CSE-41261	3.0		Online		Online
Data Mining: Advanced Concepts and Algorithms	CSE-41262	3.0	Online		Online	
Data Mining Practicum	CSE-41263	3.0		Online		Online
Elective Courses (Choose one.)						
Introduction to R Programming	CSE-41097	3.0	Online	Online	Online	Online
Python for Informatics	CSE-41225	3.0	Online	Online	Online	Online
Text Mining	CSE-41151	2.0			Online	

If you need to take our prerequisite statistics course and plan on completing one course per quarter, we recommend beginning in Winter or Summer. If you do *not* need to take a statistics prerequisite course, you should start in the Fall or Spring with Fundamentals of Data Science.

Electives

You must take at least one listed elective course to fulfil your elective requirement for the program. There are multiple courses to choose from and courses are offered in both in-class and online formats. Some elective have prerequisite requirements you must meet prior to enrolling.

- Introduction to Programming or equivalent knowledge is recommended, but not required, for Introduction to R Programming.
- Prior knowledge of the Python language is required for Data Analytics Using Python course. Students should have completed Intro to Programming (Python) or Crash Course in Python for Data Analytics (CSE-41386) or have equivalent knowledge.

Length

Most students complete the program in approximately a year and a half by taking one course per quarter for six consecutive quarters. You have up to five years to complete all requirements for the certificate.

Cost

The program costs approximately $4,544 including the certificate fee, course fees and required textbooks. This is an *estimate* of the full cost of the program. This estimate may vary based on a variety of factors, including in what format you take courses (online or in-class), which elective you choose, if you need to take the prerequisite and where you purchase your textbooks. The cost of attendance does not include parking, transportation, or personal expenses. *All estimated costs are subject to change*; current fees and textbooks are listed on our website.

Program fees are paid on a per-course basis, when you enroll in a course.

Additional Learning

If you would like to further your learning, after completing the program, we recommend you take additional data science courses. If you would like us to offer additional courses in data science, we would be interested to hear what topics you would like us to cover. Contact us at unex-techdata@ucsd.edu to let us know.

Frequently Asked Questions

About the Certificate

How do I apply to the certificate program?
STEP 1: If you have a My Extension student account, skip to Step 2. If you do not have a My Extension account, go to myextension.ucsd.edu, click "Create an account" on the right side of the page, and follow the instructions to create an account. Once you have a My Extension account, continue to Step 2.

STEP 2: Click on the "Apply Now" button on the certificate page. Complete the required fields on the application. Then click the "Save" button. Once you have saved the application, the "Submit" button will appear. Click the "Submit" button to submit your application for review and consideration. Once submitted, your application cannot be changed. You can track the progress of your application at My Extension.

Is there an application fee for the certificate program?
Current application or certificate enrollment fees, if any, are listed under the "Apply Now" button on the certificate page on our website.

Can I register for the certificate program at any time?
Yes, you may enroll in the program at any time. However, it is recommended that you enroll as soon as possible. The program curriculum may be updated at any time; if certificate requirements change, you must adhere to the curriculum

at the time of your enrollment into the certificate. Enrolling in the certificate also gives you access to quarterly, personalized enrollment reminders from the program manager.

Can this certificate program be completed entirely online?
Yes! This program is designed for you to take it online in the convenience of your own home or office. Some courses may also have in-class options, but all program requirements can be completed online. For online courses, all assignments, tests, and quizzes can be completed online and submitted through our online learning platform.

How long do I have to complete the certificate?
You officially have five years from when you begin taking courses in the program to complete all requirements for the certificate.

If I already have the skills taught in one of the courses, can I skip that course?
If you have taken a course from an accredited university covering the learning objectives of a program course, you may be able to transfer your previous coursework to Extended Studies. If you have not taken a course elsewhere, but already have the skills covered in a course, you may be able to substitute an alternate Extended Studies course in its place. Please contact us at unex-techdata@ucsd.edu for more information.

Is this certificate program open to non-California residents?
Yes, the program is open to non-California residents, including non-US residents. The tuition is the same for all students. If you have questions about how enrolling in courses may or may not affect your visa status, please contact our International Department at ipinfo@ucsd.edu or (858) 534-6784.

If I work full-time, will I still be able to complete this program?
Yes. Our programs are designed to be working-student friendly and most of our students are working professionals. The courses vary between two and three units, which amount to approximately 18-20 hours of class time for a two unit course and 27-30 hours of class time for a three unit course.

Is the program accredited?
UC San Diego is accredited by the Western Association of Schools and Colleges (WASC). UC San Diego Division of Extended Studies — like all other UC San Diego schools, colleges, and departments — is accredited by WASC through the University. All courses and certificate programs offered by UC San Diego Extended Studies have been developed and are administered in accordance with Extended Studies policy and the regulations of the Academic Senate of the University of California.

Will this program prepare me for a certification exam?
This program is not aligned with any one certification exam. Our programs are designed to provide students with knowledge that will make them valuable in the workforce.

How do I get my certificate once I have completed the requirements?
When you have paid your certificate fee and successfully completed all program requirements, you will need to request an audit by Student Services. To request an audit:

- In your My Extension account, click on "My Courses."
- On the right side of the page under "My Certificates," click on the name of the certificate.
- On the right side of the page under "Tools," click on "Request Certificate Audit."
- Complete and submit the form that appears.

Once you have formally submitted your audit request, your certificate will be mailed to the address we have on file for you within ten business days.

Do you provide job or internship placement?
No, we do not currently offer job placement assistance, internships, or career services assistance.

Is financial aid available?
Yes, there are various financial aid options available to students. Please contact our Student Services Department at unex-reg@ucsd.edu or (858) 534-3400 for more information.

- Student Loans: Extended Studies offers continuing education loans through UC Approved Lenders. Each institution offers low competitive interest rates and flexible payment options. Links to UC Approved Lenders can be found on our website. You are also encouraged to contact your personal financial institution about lending solutions.
- Federal Employment Development Department: The EDD provides a comprehensive range of employment and training services in partnership with state and local agencies. More information is available on their website.
- San Diego Workforce Partnership: Career centers located throughout San Diego County offer comprehensive employment and training services. More information is available on their website.
- Veterans Education Benefits: You may be able use your veterans education benefits to help pay for your education at UC San Diego Extended Studies. You can find more information on our website.
- Free Application for Federal Student Aid: Unfortunately, FAFSA funds are limited to degree programs only and cannot be used for courses or certificates at Extended Studies (such as this program).

About the Courses

When does course enrollment open for each quarter?
Our classes post to our website and become open for enrollment approximately two months prior to the new quarter starting. If you'd like to get an email reminder you can sign up for our newsletter(s) in My Extension, under the "Preferences" tab.

When should I enroll in a course?
We recommend enrolling as soon as possible, as occasionally classes will reach capacity.

Once I have enrolled in a course, when will I get online access to it?
If you have enrolled at least three days before the course begins, you will have access starting on the first day of class. You should receive an email from Student Services with instructions for how to login to the course. If you have enrolled on or after the start date of the course, you will have access to the course within one business day.

When does enrollment for a course close?
Enrollment in a course may be closed for one or more of the following reasons:

- The course is at capacity. If the course is at capacity you will only be able to join the waitlist. If space becomes available in the course, students on the waitlist are contacted in the order they joined the waitlist.
- The course has progressed to a point where students will no longer be able to make-up missed work and be successful in the course.
- The course is cancelled due to low enrollments.

For all three of these reasons we recommend students enroll early in the courses they are interested in.

When is the refund deadline for courses?
The refund deadline for courses in this program is typically one week after the start of the course. This allows you to enroll in a course and participate in the course for approximately one week to determine if the course is a good fit. Then, if needed, either you may either transfer your enrollment to a different course or submit a drop request. The exact refund deadline for each section is listed in the section notes.

What are the grading options for courses?

You can take courses for one of three options: Letter Grade, Pass/No Pass, or Not for Credit. If you are taking a course towards a certificate you *must* complete your courses for credit (i.e. Pass/No Pass or Letter Grade) and receive a C-/Pass or higher grade. Grades below a C-, No Pass, and Not for Credit will *not* count towards certificate requirements.

What kind of credit do I earn?

The courses in this program are post-baccalaureate, professional-level, credit bearing courses. Credit earned in these courses may lead to the award of a formal certificate by UC San Diego Extended Studies or may be applied toward an academic degree or professional credential, *subject to the approval of the receiving institution*.

If you wish to transfer credit, it is your responsibility to confer with the receiving institution before enrolling, as each individual academic institution decides whether or not to accept Extended Studies' credits.

Are courses transferrable?

UC San Diego Extended Studies is not a degree granting institution, however many UC San Diego Extended Studies courses can be transferred to other colleges or universities. The transferability of credit is determined solely by the *receiving* institution. You should discuss how your individual courses will transfer with the Office of the Registrar at the receiving institution *prior to enrolling*.

Can I take a course without registering for the certificate?

Yes, you may take any course in this program without registering for the certificate, provided you have fulfilled any and all prerequisites for the course.

How long is each course?

Two unit courses run for approximately 6-7 weeks; three unit courses run for approximately 9-10 weeks. For exact course dates of upcoming sections, visit the webpage of the course you are interested in taking on our website.

When is each course offered?

Please visit the course page on our website to see when courses are typically offered. You can also see a full program schedule by clicking on the "Print Program Schedule" button under the "Courses" section on the certificate page or on page 2 of this document.

How many hours can I expect to spend studying outside of class time?

Each student has their own learning style so this can vary greatly. As a rule of thumb, expect to spend an average of two hours studying for every hour you spend in-class. For online courses, students should plan to spend approximately 8-10 hours per week viewing lectures and completing coursework.

How are the online courses formatted?

The online courses are asynchronous: they have a start and end date but all the lessons are uploaded on Canvas, our online learning management system, so you can learn at your own pace. However, please be aware that you may have weekly assignments, quizzes, or tests that are due on specific dates. Please click here to view a sample course tour to see if this format suits your learning style.

For online courses, will I ever need to attend in person?

The online courses in this program are offered entirely online. All course requirements, including lectures, tests, quizzes, and assignments will be completed online. You will not be required to attend in person.

What are the instructors' credentials?
The program courses are taught by seasoned professionals and overseen by an advisory board of leaders in the field. You can view the advisor list under the "Advisors" section on the certificate page. You can find information about a course instructor, including a biography and credentials, on the course page.

How do I communicate with a course instructor if I have a question during the course?
Each instructor has his/her own preferred method of communication and response policy, which will be detailed on the course syllabus. However, most instructors utilize email or the discussion board and will respond within 24-48 hours.

Will I get any hands-on experience in the program?
Most courses combine theory with hands-on exercises. For more information about practical experience in any course, visit the course page on our website.

What are the required textbooks for a course?
Instructors will post the current text requirements and recommendations on the course page on our website. Please note the textbooks requirements are subject to change every quarter and different instructors may require different books, even if they are teaching the same course in the same quarter, so be sure to check the textbook requirements *for the section in which you are enrolling*.

Will I be able to order the required textbooks before the class begins?
Yes, you can order the book(s) any time after enrolling in the course. You may order books through the campus bookstore or online retailers, such as Amazon.com.

What software is used for courses and what are the system requirements?
Each course has different software requirements. Please see the course page on our website for details. If no software is listed, you will not be using any.

After I enroll in a course, how can I retrieve a receipt or enrollment verification for my records?
Login to your My Extension account and select "Documents" as the top of the page.

How will I receive my final course grade?
Once the course is completed, the instructor has 10 business days to submit your grades. Once grades have been posted, you can view and print them from your My Extension account.

What if I am having trouble with Canvas or My Extension?
Please contact Student Services at (858) 534-3400 or unex-reg@ucsd.edu if you experience any issues logging in to any of our systems.

For More Information
For program specific questions, please visit the certificate page on our website or contact a program representative at unex-techdata@ucsd.edu . For administrative questions, please contact our Student Services Department at unex-reg@ucsd.edu or (858) 543-3400.

Last updated on 11/30/2020

Statistics Prerequisite Self-Assessment Quiz

1. This is a broad category of applications and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions.

    a) data mart
    b) business information warehouse
    c) business intelligence
    d) business warehouse

2. This is the practice of dividing a customer base into groups of individuals that are similar in specific ways relevant to marketing, such as age, gender, interests, spending habits, and so on.

    a) customer managed relationship
    b) customer life cycle
    c) customer segmentation
    d) change management

3. In data mining, this is a technique used to predict future behavior and anticipate the consequences of change.

    a) predictive technology
    b) disaster recovery
    c) phase change
    d) predictive modeling

4. If there are two sets, X={2,3,4} and Y=(2,1,5,4}, how many elements does the union of X and Y have?

    a) 2
    b) 3
    c) 4
    d) 5

5. Working with Binary numbers what is 1 AND 0 = ?.

    a) 1
    b) 0
    c) 11
    d) 10

6. Calculate the Euclidean distance between the points (0, 0) and (3, 4).

    a) 1
    b) 7
    c) 5
    d) 25

7. From a population with a variance of 900, a sample of 225 items is selected. At 95% confidence the margin error is:

    a) 15
    b) 2
    c) 3.92
    d) 4

8. On average, how many times must a 6-sided die be rolled until a 6 turns up?

    a) 1/6
    b) 5/6
    c) 5
    d) 6

9. What is plotted in the ROC curve?

    a) Specificity/Sensitivity
    b) True Positive/True Negative
    c) Probability/Actual Values
    d) False Positive/False Negative

10. Given that P(A) = 0.4, P(B) = 0.5, and P(A and B) = 0.20, determine P(A|B)

    a) 0.1
    b) 0.4
    c) 0.5
    d) 0.6

Answers:

1) C
2) C
3) D
4) D
5) B
6) C
7) C
8) D
9) A
10) B