

KEAN UNIVERSITY – COLLEGE OF SCIENCE, MATHEMATICS AND TECHNOLOGY

(78308) B.S. in Computer Science (Data Science Option): 120 S.H.

Minimum GPA Required for Declaration: 2.50

Minimum GPA Required for Major: 2.50

Overall Minimum GPA Required for Graduation: 2.50

EFFECTIVE DATE: Fall 2021

GENERAL EDUCATION		33 S.H.	ACADEMIC MAJOR		44 S.H.
<b>Foundation Requirements</b> <sup>1</sup>		13 S.H.	<b>Major Core</b> **		14 S.H.
GE 1000 Transition to Kean <sup>2</sup> or GE 3000 Transfer Transitions <sup>2</sup>	1		CPS 2231 Computer Programming <sup>5</sup>		4
ENG 1030 College Composition <sup>3</sup>	3		CPS 2232 Data Structures		4
MATH 1054 Precalculus <sup>4</sup>	3		CPS 2390 Computer Organization and Architecture		3
COMM 1402 Speech Communication as Critical Citizenship	3		CPS 3250 Computer Operating Systems		3
GE 2024 Research & Technology	3				
			<b>Major Concentration</b> **		15 S.H.
<b>Disciplinary &amp; Interdisciplinary Distribution Requirements</b> <sup>1</sup>			CPS 3500 Programming World Wide Web Servers		3
<b>Humanities</b>		6 S.H.	CPS 3740 Database Management Systems		3
ENG 2403 World Literature *	3		CPS 4721 Data Mining Principles		3
<i>take one "GE Approved" course from one area below</i>			CPS 4745 Visualization Design and Development <sup>WE</sup>		3
Fine Arts/Art History	3		CPS 4802 AI Machine Learning Algorithms		3
Philosophy or Religion	3				
Foreign Languages ( <i>must take I and II for credit</i> )	3		<b>Major Electives</b> **, 7		12 S.H.
Music or Theatre	3		CPS 3xxx or 4xxx		3
Interdisciplinary	3		CPS 3xxx or 4xxx		3
			CPS 3xxx or 4xxx or 5xxx		3
<b>Social Sciences</b>		6 S.H.	CPS 3xxx or 4xxx or 5xxx		3
HIST 1062 Worlds of History *	3				
<i>take one "GE Approved" course from one area below</i>			<b>Major Capstone</b> **		3 S.H.
Psychology	3		CPS 4951 Senior Project or CPS 4961 Senior Research <sup>10</sup>		3
Economics or ES 1010 World Geography	3				
Political Science	3				
Sociology or Anthropology	3		<b>FREE ELECTIVES</b>		13-14 S.H.
Interdisciplinary	3		<i>at least 50% must be 3000/4000 level</i>		
			<i>(recommended: CPS 1996 Research Initiative for Freshmen)<sup>8</sup></i>		1
<b>Science and Mathematics</b>		8 S.H.	<i>(recommended: CPS 2010 Career Education)<sup>8</sup></i>		1
CPS 1231 Fundamentals of Computer Science **, 5	4		<i>(recommended: CPS 3291/92/93 Career Internship in CS)<sup>9</sup></i>		1-6
Lab Science (BIO 1300, CHEM 1083, or PHYS 2091/95) <sup>6</sup>	4				
<b>ADDITIONAL REQUIRED COURSES</b> **		29-30 S.H.	<b>Special Notes:</b>		
Lab Science II (BIO 1400, CHEM 1084, or PHYS 2092/96) <sup>6</sup>	4		<sup>1</sup> See pre-requisites and equivalencies (on page 2)		
TECH 2920 Computer Systems	3		<sup>2</sup> University requirement for graduation for all undergraduate students that must be satisfied in one of two ways: Complete GE 1000 (all freshmen and transfers entering with 0-29 credits) OR complete GE 3000 (transfers entering with 30 credits or more)		
ENG 3091 Technical Writing	3				
MATH 2110 Discrete Structures	3				
MATH 2415 Calculus I <sup>4</sup>	4		<sup>3</sup> ENG 1030 requires grade of C or higher		
MATH 2416 Calculus II or MATH 2995 Matrix & Linear Algebra	3/4		<sup>4, 5, 6, 7, 8, 9</sup> See notes (on page 2)		
MATH 2526 Applied Statistics I	3		<sup>10</sup> Prior research experience and petition required for CPS 4961		
MATH 3526 Applied Statistics II	3		*GE Distribution course required of all students		
MATH 3700 Big Data Computing	3		**All Major courses, All Additional and supporting courses, including Capstone requires grade of C or higher		
			<sup>WE</sup> Writing Emphasis course		

# GENERAL EDUCATION AND UNIVERSITY REQUIREMENTS

## GENERAL EDUCATION INFORMATION AND REQUIREMENTS

### Testing and Placement

Incoming freshmen and transfer students may be placed in specific GE Foundations, Developmental or ESL courses as a result of testing and/or multiple measures placement prior to registration. Students may be exempt from testing due to SAT/ACT scores or prior college work.

### Prerequisites and Equivalencies for GE Foundations Courses

**GE 1000/GE 3000 is a University Graduation Requirement**

#### GE 1000

Required of all freshmen & transfers entering with 0-29 credits

Prereq: None

Equiv: ID 1001

#### GE 3000

Required of transfers entering with 30 credits or more

Prereq: 30 credits and ENG 1030

#### ENG 1030

Prereq: Placement testing or exemption from placement testing

ENG 1025 if required by placement testing

Equiv: ENG 1031/1032, ENG 1033/1034, ENG 1430 (ESL version), ENG 1620 (Honors version), ENG 1020, ENG 1400

#### MATH 1000 or MATH 1044\*

Prereq: MATH 0901 if required by placement testing

\*MATH 1044 is available as a Foundation option for CBPM students only

Equiv of MATH 1000: MATH 1001/1002, MATH 1003/1004, MATH 1051

#### MATH 1010 or 1016 or 1030

Prereq: MATH 0901 if required by placement testing

Co-requisite: Math 0902 (only required, with advisement, based on placement test score and intended major)

#### MATH 1054

Prereq: MATH 0901 if required by placement testing and MATH 1000

#### COMM 1402

Prereq: CS 0412 if required by placement testing

ENG 1025 if required by placement testing

May be taken concurrently with ENG 1030

Equiv: COMM 1400

**GE 2021- 2026** Research and Technology is offered as college-based course

GE 2021 College of BPM

GE 2022 College of EDU

GE 2023 All College of CLA

GE 2024 College of NAHS & NJCSTM & NWGC (Speech Language and Hearing Science majors)

GE 2025 SFPA & Michael Graves College

GE 2026 Undecided Majors and other special populations

Prereqs: CS 0412 if required by placement testing; ENG 1030 or equivalent course

Equiv: GE 2020

### GE Distribution Courses

#### Approved GE Distribution Courses

All courses taken under the General Education Disciplinary/Interdisciplinary Distribution requirements must be selected from the Approved General Education Distribution Course List.

These courses are designated as GEHU, GESS, and GESM.

GEHU Humanities

GESS Social Sciences

GESM Science and Mathematics

#### Required GE Distribution Courses

**ENG 2403** is a required Humanities Distribution course with an emphasis on diversity.

Prereq: CS 0412 if required by placement testing; ENG 1030 or equivalent

Equiv: ENG\*2203

**HIST 1062** is a required Social Sciences Distribution course.

Prereq: None

#### Foreign Language Credit

The three credits for a foreign language that may satisfy the GE Disciplinary/Interdisciplinary

Distribution Requirement are awarded only upon successful completion of the second of two

semesters of study at the introductory or intermediate level.

Credit for the first semester may be used as elective credit.

## UNIVERSITY REQUIREMENTS

### GE 1000/3000 Requirement

All undergraduate students must satisfy this University requirement for graduation by

successfully completing one of the following courses at Kean University: GE 1000 Transition to

Kean (all freshmen and transfers entering with 0-29 credits) or GE 3000 Transfer Transitions

(transfers entering with 30 credits or more).

### Writing-Emphasis Requirement

All students are required to complete one "Writing- Emphasis" course. The "W-E" course must

be within the major portion of your program. Consult your major program advisor for specific

information.

Note: Equivalent courses may be prior General Education or prerequisite course work taken by students that is now discontinued.

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<sup>4</sup> Students who do not qualify on the placement test to take MATH 1054, must take MATH 1000 first (In this case, MATH 1000 will fulfill Free Electives). Students eligible to take MATH 2415 based on their placement test may take that course in place of MATH 1054 (In this case, MATH 2415 will fulfill GE Foundation Requirements and the student may take an additional 3 credits in Free Electives to total 120 S.H.).

<sup>5</sup> Students who have had prior programming experience may enter CPS 2231 directly with approval of the Departmental Advisory Committee (In this case, CPS 2231 will fulfill GE Science and Mathematics Distribution and the student may take another 4 credits in Major Electives to total 120 S.H.).

<sup>6</sup> A 2-semester Lab Science sequence, with 4 credits in GE Science and Mathematics Distribution and 4 credits in Additional Requirements. Both Lab Science courses must be from the same department (BIO, CHEM, or PHYS).

<sup>7</sup> With approval of the Graduate Program Coordinator, undergraduate students may take up to two CPS 5xxx level graduate courses as Major

Electives (NOTE: For any graduate course to be credited towards the M.S. in CIS graduate program, students must take additional credits in Major or Free Electives to total 120 S.H.).

### <sup>8</sup> Optional Freshman Research Course

Students can take 1 credit which may fulfill Free Electives requirements with approval of the Departmental Advisory Committee. CPS 1996 Research Initiative for Freshmen is recommended to be taken in the second semester of the freshman year. CPS 1996, CPS 2010 are courses acceptable for use in Free Electives and are managed by the School of Computer Science and Technology.

### <sup>9</sup> Optional Internship Course

Students can take a maximum of 6 credits for CPS 3291/92/93 Career Internship in CS which are internship courses acceptable for use in Free Electives managed by Career Services. Students interested should contact Career Services.

Additional Required Courses Prerequisites (Pre/corequisites may change, consult KeanWise)

Course	Prerequisite
TECH 2920 Computer Systems	CPS 1231
ENG 3091 Technical Writing	ENG 1030
MATH 2110 Discrete Structures	MATH 1054
MATH 2415 Calculus I	
MATH 2526 Applied Statistics I	
MATH 2416 Calculus II or MATH 2995 Matrix & Linear Algebra	MATH 2415
MATH 3700 Big Data Computing	MATH 2526
MATH 3526 Applied Statistics II	

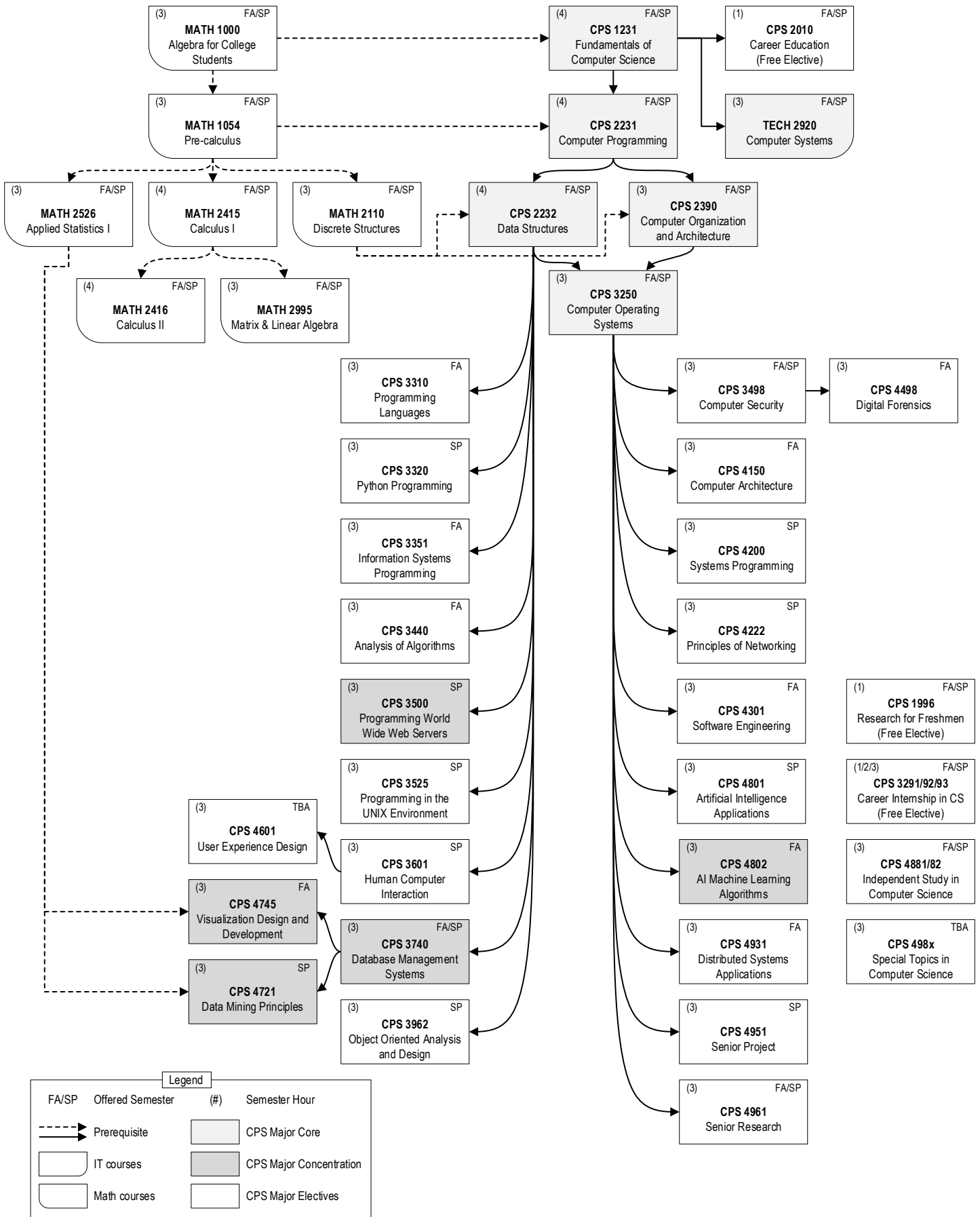
## REQUIREMENTS FOR DECLARATION TO THE MAJOR

The School of Computer Science and Technology has adopted the following standards for declaration to all options of the Computer Science major:

- a) Minimum cumulative GPA of 2.5 at the time of declaration to the major.
- b) Completion of at least 12 credits of CPS Major courses at Kean University with a grade of C or higher in each.

**Your major department is located in Green Lane Academic Building (GLAB), Room 228, Tel: 908-737-4700.**

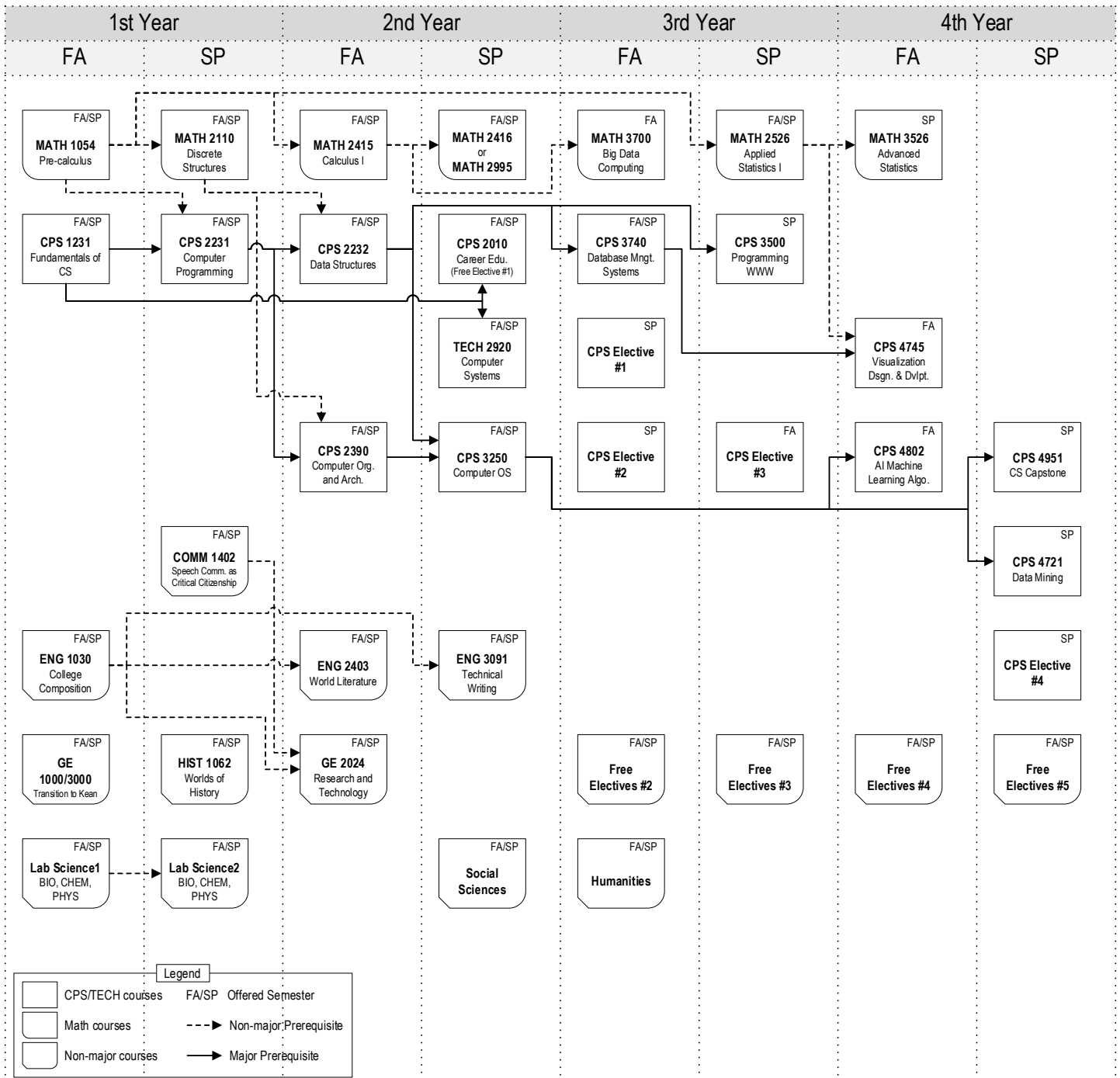
# (78308) B.S. in Computer Science (Data Science Option): Prerequisite Flow Chart



## Computer Science Course List

Course #	S.H.	Course Title	FA	SP	Prerequisites
CPS 1010	1	Introduction to Computing Systems at Kean	*	*	CPS 1231; Transfer students only; 1 Credit; P/F
CPS 1231	4	Fundamentals of Computer Science	*	*	MATH 1000
CPS 2231	4	Computer Programming	*	*	CPS 1231 and MATH 1054
CPS 2232	4	Data Structures	*	*	CPS 2231 and MATH 2110
CPS 2390	3	Computer Organization and Architecture	*	*	CPS 2231 and MATH 2110
CPS 3250	3	Computer Operating Systems	*	*	CPS 2232 and CPS 2390
CPS 3310	3	Programming Languages	*		CPS 2232 or CPS 2240
CPS 3320	3	Python Programming		*	CPS 2232 or CPS 2240
CPS 3351	3	Information Systems Programming	*		CPS 2232
CPS 3440	3	Analysis of Algorithms	*		CPS 2232
CPS 3498	3	Computer Security	*	*	CPS 3250
CPS 3500	3	Programming World Wide Web Servers		*	CPS 2232
CPS 3525	3	Programming in the UNIX Environment		*	CPS 2232
CPS 3601	3	Human Computer Interaction		*	CPS 2232
CPS 3740	3	Database Management Systems	*	*	CPS 2232
CPS 3962	3	Object Oriented Analysis and Design		*	CPS 2232
CPS 4150	3	Computer Architecture	*		CPS 3250
CPS 4200	3	Systems Programming		*	CPS 3250
CPS 4222	3	Principles of Networking		*	CPS 3250
CPS 4301	3	Software Engineering	*		CPS 3250
CPS 4498	3	Digital Forensics	*		CPS 3498
CPS 4601	3	User Experience Design	TBA		CPS 3601
CPS 4721	3	Data Mining Principles		*	CPS 3740 and MATH 2526
CPS 4745	3	Visualization Design and Development	*		(CPS 3740 or TECH 3740) and MATH 2526
CPS 4801	3	Artificial Intelligence Applications		*	CPS 3250
CPS 4802	3	AI Machine Learning Algorithms	*		CPS 3250
CPS 4881/82	3	Independent Study in CS	*	*	Faculty permission
CPS 4931	3	Distributed Systems Applications	*		CPS 3250
CPS 4951	3	Senior Project		*	CPS 3250; To be taken final spring semester
CPS 4961	3	Senior Research	*	*	Faculty permission; By arrangement
CPS 498x	3	Special Topics in CS			Faculty permission; Topics vary
Information Technology Courses					
TECH 2920	3	Computer Systems	*	*	CPS 1231
Cooperative Education Program for CS					
CPS 2010	1	Career Education	*	*	CPS 1231; Fulfills Free Electives
CPS 3010	0	Cooperative Education I	*	*	CPS 2010; For full-time co-op program students only
CPS 3011	0	Cooperative Education II	*	*	CPS 2010; For full-time co-op program students only
CPS 4010	0	Cooperative Education Practicum	*	*	CPS 3010; For full-time co-op program students only
Freshman Research and Internship for CS					
CPS 1996	1	Research Initiative for Freshman	*	*	Faculty permission; Fulfills Free Electives
CPS 3291-93	1-3	Career Internship in Computer Science	*	*	Faculty permission; Fulfills Free Electives

## (78308) B.S. in Computer Science (Data Science Option): Recommended Sequence



1st Year		2nd Year		3rd Year		4th Year	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
MATH 1054	MATH 2110	MATH 2415	MATH 2416 or MATH 2995	MATH 3700	MATH 2526	MATH 3526	CPS 4951
CPS 1231	CPS 2231	CPS 2232	TECH 2920	CPS 3740	CPS 3500	CPS 4745	CPS 4721
ENG 1030	COMM 1402	CPS 2390	CPS 3250	CPS Elec. #1	CPS Elec. #2	CPS 4802	CPS Elec. #4
GE 1000/3000	HIST 1062	ENG 2403	ENG 3091	Free Elec. #2	CPS Elec. #3	Free Elec. #4	Free Elec. #5
Lab Science 1	Lab Science 2	GE 2024	Social Sciences	Humanities	Free Elec. #3		
			CPS 2010 - Free Elec. #1				

## (78308) B.S. in Computer Science (Data Science Option): 4-year Study Plan

This first-year study plan is for new students only. All new students should see their CS/IT faculty advisor (in Oct) to review and update their 4-year study plans before the early registration period (in Nov). **Students should pay attention to each course's prerequisites and the offered semester (CourseID CourseName (credits) (semester offered))**. Please check the academic guide sheets at <http://yoda.kean.edu/studyplans/>

Name:	Faculty Advisor:
Kean Id#	Catalog Year:

Notes: (Tip) Modify this template by typing the year, moving courses around, adding rows, etc. and make your personalized study plan.

1st Year Fall (15)	1st Year Spring (17)
<b>MATH 1054 Precalculus (3)</b>	<b>MATH 2110 Discrete Structures (3)</b>
<b>CPS 1231 Fundamentals of CS (4) (FA/SP)</b>	<b>CPS 2231 Computer Programming (4) (FA/SP)</b>
ENG 1030 College Composition (3)	COMM 1402 Speech Comm. (3)
GE 1000/3000 Transition to Kean (1)	HIST 1062 Worlds of History (3)
Lab Science 1 (4)	Lab Science 2 (4)

Internship, summer course, or summer research

2nd Year Fall (17)	2nd Year Spring (16/17)
MATH 2415 Calculus I (4)	MATH 2416 Calculus II (4) or MATH 2995 Linear Algebra (3)
<b>CPS 2232 Data Structures (4) (FA/SP)</b>	TECH 2920 Computer Systems (3) (FA/SP)
<b>CPS 2390 Computer Org. and Arch. (3) (FA/SP)</b>	<b>CPS 3250 Computer Operating Systems (3) (FA/SP)</b>
ENG 2403 World Literature (3)	ENG 3091 Technical Writing (3)
GE 2024 Research and Technology (3)	Social Sciences (3)
	CPS 2010 Career Education - Free Elective #1 (1)

Internship, summer course, or summer research

3rd Year Fall (15/16)	3rd Year Spring (15)
<b>MATH 3700 Big Data Computing (3) (FA)</b>	MATH 2526 Applied Statistics I (3)
<b>CPS 3740 Database Management Systems (FA/SP) (3)</b>	<b>CPS 3500 Programming WWW (3) (SP)</b>
CPS Major Elective #1 (3)	CPS Major Elective #2 (3)
Free Elective #2 (3)	CPS Major Elective #3 (3)
Humanities (3)	Free Elective #3 (3)

Internship, summer course, or summer research

4th Year Fall (12/13)	4th Year Spring (12)
MATH 3526 Advanced Statistics (3) (FA/SP)	<b>CPS 4951 Senior Project (3) (SP)</b>
<b>CPS 4745 Visualization Design &amp; Development (3) (FA)</b>	<b>CPS 4721 Data Mining Principles (3) (SP)</b>
<b>CPS 4802 AI Machine Learning Algorithms (3) (FA)</b>	CPS Major Elective #4 (3)
Free Elective 3000/4000 #4 (3/4)	Free Elective 3000/4000 #5 (3)

Internship, summer course, or summer research

Fall offered CPS Major Electives	Spring offered CPS Major Electives
CPS 3310 Programming Languages (3) (FA)	CPS 3320 Python Programming (3) (SP)
CPS 3351 Information Systems Programming (3) (FA)	CPS 3498 Computer Security (3) (FA/SP)
CPS 3440 Analysis of Algorithms (3) (FA)	CPS 3525 Programming in the UNIX Environment (3) (SP)
CPS 3498 Computer Security (3) (FA/SP)	CPS 3601 Human Computer Interaction (3) (SP)
CPS 4150 Computer Architecture (3) (FA)	CPS 3962 Object Oriented Analysis & Design (3) (SP)
CPS 4301 Software Engineering (3) (FA)	CPS 4200 Systems Programming (3) (SP)
CPS 4498 Digital Forensics (3) (FA)	CPS 4222 Principles of Networking (3) (SP)
CPS 4931 Distributed Systems Applications (3) (FA)	CPS 4801 Artificial Intelligence Applications (3) (SP)
CPS 4601 User Experience Design (3) (TBA)	