course

course (course_prefix, course_number, course_name, credits, prereqs_root_id, coreqs_root_id)

- course_prefix is a length two or length three character string, e.g., CS, MA, HUM.
- course_number is a three digit integer, e.g., 442, 443.
- (course_prefix, course_number) defines a particular course, e.g., (CS, 442), (CS, 443).
- course_name is the name assigned to the course by the department or program that offers it, e.g., Database Management Systems, Database Practicum, etc.
- credits is the number of credits that the course carries.
- prereqs_root_id is the root node of the tree that represents the Boolean expression that defines the prereqs of the course.
- coreqs_root_id is the root node of the tree that represents the Boolean expression that defines the coreqs of the course.
- course.prereqs_root_id → node.node_id
- course.coreqs_root_id → node.node_id

semester_offered_on_campus

semester_offered_on_campus (course_prefix, course_number, semester)

- (course_prefix, course_number) defines a course
- semester is a semester the course is offered on campus. The values of semester are fall, winter, spring, summer 1, and summer 2.
- (semester_offered_on_campus.course_prefix, semester_offered_on_campus.course_number)
  →
  (course.course_prefix, course.course_number)

semester_offered_on_webcampus

semester_offered_on_webcampus (course_prefix, course_number, semester)

- (course_prefix, course_number) defines a course
- semester is a semester the course is offered on webcampus. The values of semester are fall, winter, spring, summer 1, and summer 2.

- (semester_offered_on_webcampus.course_prefix, semester_offered_on_webcampus.course_number)
  →
  (course.course_prefix, course.course_number)

pre(co)requisite_node

node (pre(co)requisite_node_id, Boolean_operator, course_prefix, course_number, left_subtree-id, right_subtree_id)

- The pre(co)requisite_node table contains nodes of the trees that are used to represent the prerequisites of courses and to represent the corequisites of courses
- Pre(co) requisite_node_id is the id of a node of a tree that will be used to represent the prereqs of a course, or the coreqs of a course.
- Each pre(co)requisite_node contains either a Boolean operator or a course.
- If a pre(co)requisite_node contains a Boolean operator, then the value of the Boolean_operator attribute is that Boolean operator. If not, the value of Boolean_operator is null.
- If a pre(co)requisite_node contains a course, then the values of the course_prefix and course_number attributes represents the course. If not, the values of both attributes are null.
- left_subtree_id is the id of the node that will represent the root node of the left subtree of the node whose id is pre(co)requisite_node_id, if there is a left subtree – or null, if there isn't a left subtree.
- right_subtree_id is the id of the pre(co)requisite_node that will represent the root node of the right subtree of the node whose id is pre(co)requisite_node_id, if there is a right subtree – or null, if there isn't a left subtree.
- (pre(co)requisite_node.course_prefix, pre(co)requisite_node.course_number)
  →
  (course.course_prefix, course.course_number)

Instances for CS577

course

course (course_prefix, course_number, course_name, credits, prereqs_root_id, coreqs_root_id)

CS	577	Cybersecurity Laboratory	3	1	null

pre(co)requisite_node

pre(co)requisite_node (pre(co)requisite_node_id, Boolean-operator, course_prefix, course_number, left_subtree-id, right_subtree_id)

1	and	null	null	2	3
2	or	null	null	4	5
3	or	null	null	6	7
4	null	CS	306	null	null
5	null	CS	506	null	null
6	or	null	null	8	9
7	or	null	null	10	11
8	null	CS	590	null	null
9	null	CS	570	null	null
10	null	CS	385	null	null
11	null	CS	182	null	null

set_of_courses (<u>name_of_set, course_prefix, course_number</u>)

- set_of_courses is a set of courses that will be involved in the definition of a degree requirement. Each row of an instance of set_of_courses represents a specific course
- name_of_set is the name of the set of courses.
- course_prefix is the prefix of the course
- course_number is the number of the course
- set_of_courses.course_prefix → course.course_prefix
- set_of_courses.course_number → course.course_number

degree_requirement_root (<u>degree_requirement_root_node_id</u>,
name_of_degree_requirement)

degree_requirement_root is the root of a tree that defines a degree requirement

- degree_requirement_root_node_id is the integer-valued id of the root of the tree that defines the degree requirement
- name_of_degree_requirement is the name of the degree requirement, for example, math_requirement.

degree_requirement_node (<u>degree_requirement_node_id</u>,
name_of_set_of_courses, number_from_set_of courses
Boolean_operator,
requirement_left_subtree_id,
requirement_right_subtree_id)

degree_requirements_node is a non-root node of a tree that defines a degree requirement

- degree_requirement_node_id is the integer-valued id of the node
- name_of_set_of_ courses is the name of a set of courses that will be involved in the definition of the degree requirement if the node is a leaf node of the tree, and null if it isn't
- number_from_set_of_courses is an integer that represents the number of courses from the set of courses that must be taken.
- Boolean_operator is a Boolean operator if the node is not a leaf node of the tree, and null if it is
- requirement_left_subtree_id is the id of the root node of the left subtree of the tree if there is a left subtree, and null if there isn't.
- requirement_right_subtree_id is the id of the root node of the right subtree of the tree if there is a right subtree, and null if there isn't.
- degree_requirements_node. name_of_set_of_ courses → set_of_courses.name_of_set

MATH_REQUIREMENT

MA121 –Differential Calculus

MA122 – Integral Calculus

MA123 – Series, Vectors, Functions, and Surfaces

MA124 – Calculus for Functions of Two Variables

MA222 – Probability and Statistics

MA331 – Intermediate Statistics

set_of_courses (name_of_set, course_number, course_name)

math_courses	MA	121
math_courses	MA	122
math_courses	MA	123
math_courses	MA	124
math_courses	MA	222
math_courses	MA	331

degree_requirement_root (degree_requirement_root_node_id,
name_of_degree_requirement)

1	math_requirement

degree_requirement_node (degree_requirement_node_id,
name_of_set_of_courses, number_from_set_of courses
Boolean_operator,
requirement_left_subtree_id,
requirement_right_subtree_id)

1	math_courses	6	null	null	null

CS_REQUIREMENT: Recall that CS115, CS181, CS284, CS182, and CS385 will be dealt with separately, together with TECH_REQUIREMENT and that CS522, CS546, and CS548 will be dealt with separately from the rest of the required CS courses.

CS115 or CS181 - Introduction to Computer Scienc

CS146 – Intro to Web Programming & Proj. Dev.

CS135 – Discrete Structures

CS284 or CS182 - Data Structures

CS334 – Automata & Computation

CS383 – Computer Organization & Programming

CS385 – Algorithms _____[4]

CS347 – Software Development Process

CS392 - Systems Programming

CS496 – Principles of Programming Languages

CS442 - Database Management Systems

CS443 – Database Practicum

CS511 - Concurrent Programming

CS492 – Operating Systems

CS522 or CS546 or CS548 (circle one)

CS306 – Intro to IT Security

CS423 – Senior Design I

CS485 - Societal Impact of Info. Technologies

CS424 – Senior Design II

set_of_courses (name_of_set, course_number, course_name)

cs_courses_part_1	CS	146
cs_courses_part_1	CS	135
cs_courses_part_1	CS	334
cs_courses_part_1	CS	383
cs_courses_part_1	CS	347
cs_courses_part_1	CS	392
cs_courses_part_1	CS	496
cs_courses_part_1	CS	442
cs_courses_part_1	CS	443
cs_courses_part_1	CS	511
cs_courses_part_1	CS	492
cs_courses_part_1	CS	306
cs_courses_part_1	CS	423
cs_courses_part_1	CS	485
cs_courses_part_1	CS	424
math_courses	MA	121
math_courses	MA	122
math_courses	MA	123
math_courses	MA	124
math_courses	MA	222
math_courses	MA	331

set_of_courses (name_of_set, course_number, course_name)

cs_courses_part_2	CS	522
cs_courses_part_2	CS	546
cs_courses_part_2	CS	548
cs_courses_part_1	CS	146
cs_courses_part_1	CS	135
cs_courses_part_1	CS	334
cs_courses_part_1	CS	383
cs_courses_part_1	CS	347
cs_courses_part_1	CS	392
cs_courses_part_1	CS	496
cs_courses_part_1	CS	442
cs_courses_part_1	CS	443
cs_courses_part_1	CS	511
cs_courses_part_1	CS	492
cs_courses_part_1	CS	306
cs_courses_part_1	CS	423
cs_courses_part_1	CS	485
cs_courses_part_1	CS	424
math_courses	MA	121
math_courses	MA	122
math_courses	MA	123
math_courses	MA	124
math_courses	MA	222
math_courses	MA	331

degree_requirement_root (degree_requirement_root_node_id,
name_of_degree_requirement)

2	cs_requirement
1	math_requirement

degree_requirement_node (degree_requirement_node_id,
name_of_set_of_courses,
number_from_set_of courses
Boolean_operator,
requirement_left_subtree_id,
requirement_right_subtree_id)

1	math_courses	6	null	null	null
2	null	null	and	3	4
3	cs_ courses_part_1	15	null	null	null
4	cs_ courses_part_2	1	null	null	null

BT353 Project Management

set_of_courses (<u>name_of_set, course_number, course_name</u>)

management_courses	BT	353
cs_courses_part_2	CS	522
cs_courses_part_2	CS	546
cs_courses_part_2	CS	548
cs_courses_part_1	CS	146
cs_courses_part_1	CS	135
cs_courses_part_1	CS	334
cs_courses_part_1	CS	383
cs_courses_part_1	CS	347
cs_courses_part_1	CS	392
cs_courses_part_1	CS	496
cs_courses_part_1	CS	442
cs_courses_part_1	CS	443
cs_courses_part_1	CS	511
cs_courses_part_1	CS	492
cs_courses_part_1	CS	306
cs_courses_part_1	CS	423
cs_courses_part_1	CS	485
cs_courses_part_1	CS	424
math_courses	MA	121
math_courses	MA	122
math_courses	MA	123
math_courses	MA	124
math_courses	MA	222
math_courses	MA	331

degree_requirement_root (degree_requirement_root_node_id,
name_of_degree_requirement)

5	management_requirement
2	cs_requirement
1	math_requirement

degree_requirement_node (degree_requirement_node_id,
name_of_set_of_courses,
number_from_set_of courses
Boolean_operator,
requirement_left_subtree_id,
requirement_right_subtree_id)

1	math_courses	6	null	null	null
2	null	null	and	3	4
3	cs_ courses_part_1	15	null	null	null
4	cs_ courses_part_2	1	null	null	null
5	management_courses	1	null	null	null

SCIENCE_REQUIREMENT

ysics	PEP 111 Mechanics	PEP 112 E&M
ıemistry	CH 115 Gen Chem I	CH 116 Gen Chem II
ıem & Bio	CH 115 Gen Chem I	CH 281 Bio & Biotech
ıem & Bio	CH 115 Gen Chem I	CH 281 Bio & Biotech
ysics & Bio	PEP 111 Mechanics	CH 281 Bio & Biotech

set_of_courses (name_of_set, course_number, course_name)

physics_sequence	PEP	111
physics_sequence	PEP	112
physics_sequence	PEP	221
chemistry_sequence	CH	115
chemistry_sequence	CH	116
chemistry_sequence	CH	117
chem&bio_sequence_1	CH	115
chem&bio_sequence_1	CH	281
chem&bio_sequence_1	CH	117
chem&bio_sequence_2	CH	115
chem&bio_sequence_2	CH	281
chem&bio_sequence_2	CH	282
physics&bio_sequence	PEP	111
physics&bio_sequence	CH	281
physics&bio_sequence	CH	282
management_courses_	BT	353
cs_courses_part_2	CS	522
cs_courses_part_2	CS	546
cs_courses_part_2	CS	548
cs_courses_part_1	CS	146
cs_courses_part_1	CS	135
cs_courses_part_1	CS	334
cs_courses_part_1	CS	383
cs_courses_part_1	CS	347
cs_courses_part_1	CS	392
cs_courses_part_1	CS	496
cs_courses_part_1	CS	442
cs_courses_part_1	CS	443
cs_courses_part_1	CS	511
cs_courses_part_1	CS	492
cs_courses_part_1	CS	306
cs_courses_part_1	CS	423
cs_courses_part_1	CS	485
cs_courses_part_1	CS	424
math_courses	MA	121
math_courses	MA	122
math_courses	MA	123
math_courses	MA	124
math_courses	MA	222
math_courses	MA	331

degree_requirement_root (degree_requirement_root_node_id,
name_of_degree_requirement)

6	science_requirement
5	management_requirement
2	cs_requirement
1	math_requirement

degree_requirement_node (degree_requirement_node_id,
name_of_set_of_courses,
number_from_set_of courses
Boolean_operator,
requirement_left_subtree_id,
requirement_right_subtree_id)

1	math_courses	6	null	null	null
2	null	null	and	3	4
3	cs_ courses_part_1	15	null	null	null
4	cs_ courses_part_2	1	null	null	null
5	management_courses	1	null	null	null
6	null	null	or	7	8
7	physics_sequence	3	null	null	null
8	null	null	or	9	10
9	chemistry_sequence	3	null	null	null
10	null	null	or	11	12
11	chem&bio_sequence_1	3	null	null	null
12	null	null	or	13	14
13	chem&bio_sequence_2	3	null	null	null
14	null	null	or	15	null
15	physics&bio_sequence	3	null	null	null

SOFTWARE_DEVELOPMENT_REQUIREMENT