



**Division of Philosophy, Humanities and Library Sciences
Philosophy Department**

<https://www.hccs.edu/programs/areas-of-study/liberal-arts-humanities--education/philosophy/>

Phil 2303: Introduction to Formal Logic| Lecture | #20472

Fall 2019 | 16 Weeks; Aug 26 – Dec 15, 2019

Online

3 Credit Hours | 48 hours per semester

Instructor Contact Information

Instructor: Timothy Jacobs
 Cell Phone: 765-512-3679 (text or call)
 Email: timothy.jacobs@hccs.edu

Prerequisites and/or Co-Requisites

ENGL 1301

Canvas Learning Management System

This section of PHIL 1301 will use [Canvas](https://eagleonline.hccs.edu) (<https://eagleonline.hccs.edu>)
 HCCS Open Lab locations may be used to access the Internet and Canvas. Use [Firefox](#) Or [Chrome](#) as the internet browser.





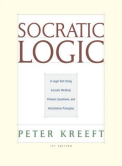
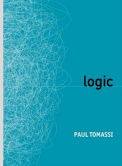

HCC Online Information and Policies

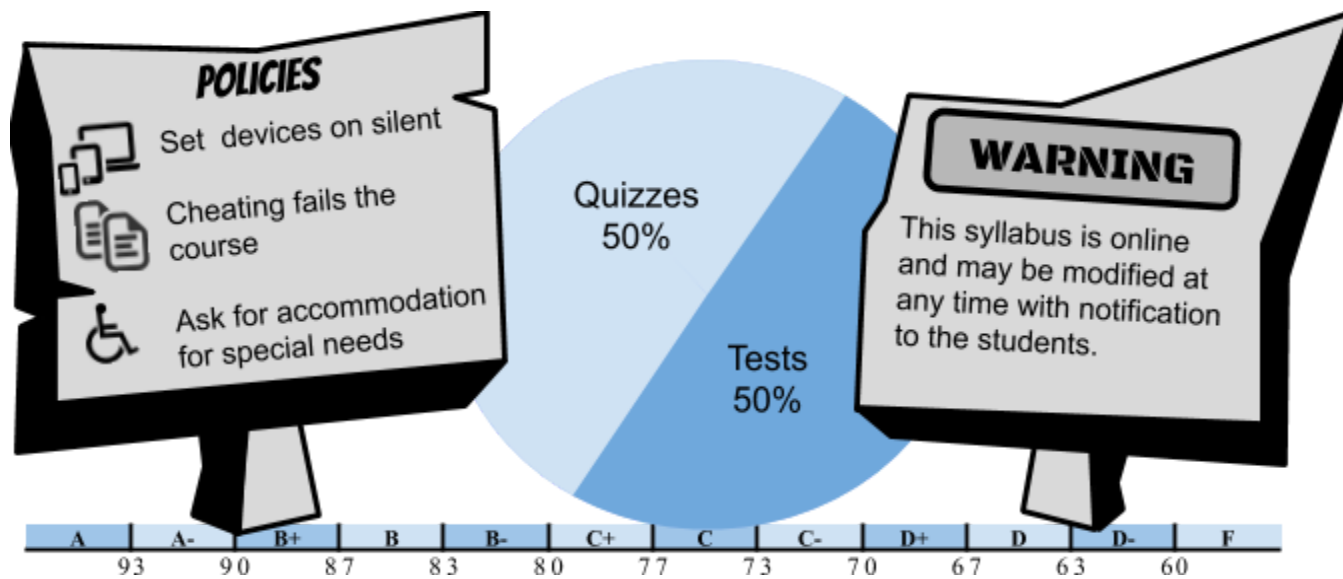
Here is the link to information about HCC Online classes including the required Online Orientation for all fully online classes: <http://www.hccs.edu/online/>

Scoring Rubrics, Sample Assignments, etc.

Look in Canvas for the scoring rubrics for assignments, samples of class assignments, and other information to assist you in the course. <https://eagleonline.hccs.edu/login/ld>

Instructional Materials

<p>Start Here</p>  <p>Class Intro Video (https://youtu.be/aseSIWrUFvg)</p>	<p>Required Materials</p>					
 <p>Online Syllabus tjacobs.com/logi c</p>	 <p>Study Guide (tj.page.link/logi) c-sg</p>	 <p>Online access to Canvas</p>	 <p><i>Socratic Logic</i> by Peter Kreeft</p>	 <p><i>Logic</i> by Paul Tomassi goo.gl/xEnqPV</p>	 <p>Videos tjacobs.page.link/Logic-Videos</p>	



Course Overview

The purpose of this course is to introduce the student to symbolic logic, including syllogisms, propositional and predicate logic, and logical proofs in a system of rules (Texas ACGM). It emphasizes the rules of translating language into symbols as well as the semantic and syntactic implications of the system of first-order logic, a method of reasoning ingredient to philosophy, mathematics, and computer programming (HCC Catalogue). This course stresses the HCC Core Objectives of Critical Thinking, Communication Skills, Empirical and Quantitative Literacy, and Teamwork.

Core Curriculum Objectives (CCOs)

This course satisfies the Component Area Option, or the Math Foundational Component Area Option in the HCC Core Curriculum. If you are not sure that you need this course to graduate, please consult with your advisor.

Program Student Learning Outcomes (PSLOs)

1. Determine the logical structure of English arguments by identifying premises and conclusions.
2. Understand basic concepts in logic, such as truth functionality, validity, soundness, counter-examples, tautology, self-contradiction, logical equivalence, logical contradictoriness, and logic consistency.
3. Translate English statements into propositional and/or predicate notation.
4. Determine the validity of symbolic propositional or predicate arguments using such methods as direct/indirect truth tables, natural deduction, and/or the finite universe method.

Course Student Learning Outcomes (CSLOs)

1. Determine the logical structure of English arguments by identifying premises and conclusions.
2. Understand basic concepts in logic, such as truth functionality, validity, soundness, counter-examples, tautology, self-contradiction, logical equivalence, logical contradictoriness, and logic consistency.
3. Translate English statements into propositional and/or predicate notation.

4. Determine the validity of symbolic propositional or predicate arguments using such methods as direct/indirect truth tables, natural deduction, and/or the finite universe method.

Learning Objectives

- 1.1 Understand the nature of logical structure in English-language arguments, including the concepts of premises, conclusions, validity, soundness, inference, strength, and cogency.
- 1.2 Identify premises and conclusions in English-language arguments and assess them for validity, soundness, strength, and cogency.
- 2.1 Learn basic logical vocabulary, including types of arguments, relations between sentences, and logical operators.
- 2.2 Assess validity, soundness, strength, cogency, logical equivalence, and logical consistency of English-language sentences.
- 2.3 Identify English-language sentences as tautology, contradiction, or contingent sentence.
- 3.1 Learn symbolic notation for each of the logical operators, including the truth table for each operator.
- 3.2 Translate English-language sentences and arguments into symbolic form using a translation key.
- 4.1 Learn the truth-table test for validity, including partial truth tables.
- 4.2 Apply the truth table method to assessing validity (finding counterexamples), identifying tautologies, contradictions, and contingent sentences, assessing logical equivalence and consistency.
- 4.3 Learn the basic rules of natural deduction, including rules of replacement.
- 4.4 Learn indirect methods of proof.
- 4.5 Derive derived rules of natural deduction.
- 4.6 Apply the rules of natural deduction to derive desired conclusions from given premises.

Assignments, Exams, and Activities Requirements



Quizzes *Due weekly on Fridays at 11:59pm*

Value: 50% (≈4% ea.)

Each week, look at the Course Calendar below, read the assigned material, follow along in the Study Guide, and complete the **open book** unit quiz as you read. Quizzes may be found [here](#). Watch the related videos for help in understanding readings.

- **What's on the quizzes?** 20 multiple choice questions on readings from the current week or any previous week. The Study Guide also provides some content not present in textbooks.
- **How do I submit quizzes?** Submit online. Quizzes are multiple-choice, online, not timed, open book. You may submit two attempts. The highest grade will be kept.
- **Can I submit late?** No, except in medical emergencies. Examples of excuses I do not accept: travel, internet issues, or malfunctioning computer or phone. Excuses will be addressed on a case-by-case basis.
- **How can I check my answers?** Try exercises first without looking, then check your answers afterward. The best way to not pass is to check answers without trying and to procrastinate. **Practice exercises from textbooks are not required**, but some will be on quizzes. Practice more than is required. For Kreeft, even answers are in the back of the book. For Tomassi, all answers are at tljacobs.com/logic or [here](#). Sometimes the symbols on the Tomassi answer documents don't appear. "Ã" means "–" or "·". If other symbols aren't appearing, try to view the documents with a different program. Contact me if you can't figure it out.



Tests

Value: 50%

Test 1:	20 questions	Content: Kreeft	10% of course grade
Test 2:	30	Kreeft & Tomassi	15%
Test 3:	50	Kreeft & Tomassi	25%

- **How do I submit tests?** Tests may be found in the online web portal. They are **NOT open book**, not timed, and contain only multiple-choice questions. It is on your honor and your conscience to not cheat.
- **What will be on tests?** Tests will include content from the required readings. They are cumulative, so any test may cover any previous content. Tests require not only memorization but also understanding and the ability to apply concepts to examples.
- **How do I study for tests?** Use the Study Guide. To practice for the quizzes and tests, I encourage you to complete 10–20 practice exercises weekly from the required reading in the textbooks.



Videos

You will be teaching yourself through readings, the Study Guide, and practice. I've collected **optional** videos to provide added help. Videos are listed in the Course Calendar. Fast forward and skip to relevant parts of videos.

- **Are videos required?** No, but they'll help you understand the content in the textbooks.
- **Will I be tested on video content?** No. In fact, the videos may deliver content differently than the textbooks or may cover additional content not required for this course. You may skip and fast forward.



Extra Credit

Value: +2% each

Write up to 5 papers from this list for +2% each on your overall course grade. Write 1000 words minimum.

1. **Debate Analysis:** Pick one debate. Write an analysis on the logical strengths & weaknesses of *both* sides.
 - [Does God Exist?](#) Debate: William Lane Craig vs. Christopher Hitchens (or read at goo.gl/MQLw4U).
 - [Is God Necessary for Morality?](#) William Lane Craig vs. Shelly Kagan Debate.
 - [Foundation of Morality.](#) Sam Harris vs. William Lane Craig.
 - [Is There Meaning in Evil?](#) Zacharias & Craig vs. Mohanty & Leikind.
2. **Proving God:** Read Thomas Aquinas's famous "Five Proofs" for the existence of God (tljacobs.com/aquinas/5proofs). In your own words, list Aquinas's steps for each proof. Provide a logical analysis of each proof using tools from this course, especially from classical logic.
3. **Two Logics:** Compare Classical and Symbolic Logic. Use Kreeft and at least two other academic sources (Bad: blog, opinion, news, wikipedia. Good: [Stanford](#); [IEP](#); [Routledge](#); [PhilPapers](#); [Academia.edu](#)).

Course Calendar

Academic Calendar: <https://www.hccs.edu/student-experience/events-calendar/>



Due Date
(11:59pm)



Readings & Homework



Videos

(tjacobs.page.link/Logic-Videos)

FRIDAY

AUGUST

30

1. Introduction; Two Logics; Three Acts of the Mind

- Syllabus
- [Kreeft, Preface: Introduction \(skip section 2\): & "Appendix"](#) (≈33pp.).
- **Syllabus Quiz:** Open book.
- Quiz 1

***BOOK:** The first couple readings are free. Click on the links. You need to purchase your own book to continue the course.

***ATTENTION:** Check your email regularly for announcements.

- [Syllabus](#)
***Note:** The syllabus video may be from a previous semester and may be slightly different. The most up-to-date information is on this syllabus.
- [Worldview](#)
- [Kreeft - All of Logic In Two pages](#)
- [Introduction to Critical Thinking](#) [knowledge, critical thinking]
- [Critical Thinking Tools](#) [Virtue, worldview, ethos-pathos-logos, What is Logic?, basic principles of logic (valid vs. sound, deduction vs. induction), Fallacies]
- [Aquinas on Free Will](#) [3 powers of living things, 3 acts of the mind].
- [How to Argue](#) [3 powers of living things, parts of an argument, deduction]
- [Three Acts of the Mind](#)

Section I: Classical Logic

FRIDAY

SEPTEMBER

6

2. First Act of the Mind: Understanding

- [Kreeft I.1–2; II; IV \(≈30pp.\)](#).
- Quiz 2

- [Universals vs. Particulars](#) [abstraction].
- [Aristotle's 12 Categories](#) [categories, substance, induction, deduction]
- [Categories, Predicables, and Division](#) [12 categories, 5 predicables].
- [Aristotle's Four Causes](#)

FRIDAY

SEPTEMBER

13

3. Fallacies

- Kreeft III (read only the intro & the fallacies listed on the Study Guide) (≈15pp.)
- Quiz 3

- [Critical Thinking Tools](#) [Fallacies]
- [Equivocation](#)
- [Straw Man](#)
- [Ad Hominem](#)
- [Appeal to Authority](#)
- [The Fallacy of a Single Cause](#) [Oversimplification]

More Videos: [False Dichotomy](#); [Non Sequitur](#); [Begging the Question](#); [Hasty Generalization](#); [Correlation Does not Imply Causation](#); [Argument from Silence](#); [Confirmation Bias](#); [Red Herring](#); [Chronological Snobbery](#)

FRIDAY

SEPTEMBER

20

4. Second Act of Mind: Judgment

- Kreeft V.1–3; VII.1 (≈11pp.)
- Quiz 4
- **Test 1: Units 1–4**

- [The Correspondence Theory of Truth](#)
- The Realism vs. Anti-Realism Debate ([Part 1](#); [Part 2](#))

✓ **Advice:** Study your test results carefully to learn what you did wrong and how you can improve for the future.

✓ **Advice:** Since you've got a quiz & test, spread out your work throughout the week. Start the weekend before. Do this every week. Procrastination kills grades.



5. Third Act of Mind: Reasoning

- Kreeft VIII–IX (≈29pp.).
- Quiz 5

- [Critical Thinking Tools](#) [3 laws of logic at 48:00].
- [Necessary and Contingent Distinction](#)
- [Thomas Aquinas on Five Proofs for God](#) [Necessary & contingent at 36:00].
- [Soundness](#) [& validity]
- [Aristotle's Four Causes](#)
- [Critical Thinking Tools](#) [valid vs. sound at 33:00; deduction vs. induction at 33:50].
- [How to Argue](#) [3 powers of living things, parts of an argument, deduction]
- [Arguments, Premises, & Conclusions \(Mark Thorsby\)](#)
- [Deduction & Induction \(Mark Thorsby\)](#)
- [Validity, Truth, Soundness, Strength, Cogency \(Mark Thorsby\)](#)



6. Induction

- Kreeft XIV (skip pp. 321–324, 336–341) (≈19pp.)
- Quiz 6

- [Inductive Argument Forms](#)



7. Syllogisms

- Kreeft X.1, 4–5; XI.2 (just p. 243); XIII.1–5 (≈20pp. total).
- Quiz 7

- [Syllogism Lesson](#) [major premise, minor premise, conclusion]
- [Categorical Syllogisms \(Thorsby\)](#) [parts of a syllogism, major term, minor term, middle term].
- [Modus Ponens & Modus Tollens](#)
- [Modus Ponens](#)
- [Modus Tollens](#)
- [Affirming the Consequent](#)
- Affirming the Consequent (symbolic)
- [Denying the Antecedent](#)
- Denying the Antecedent (symbolic)
- [Reductio ad Absurdum](#)

Section II: Symbolic Logic



8. Introduction to Propositional Logic (PL) & Truth Tables

- [Tomassi](#), ch. 2.I–VIII (skip pp. 40–42) (≈27pp.); ch. 4.I–V (≈22pp.).
- Quiz 8

✓ **Advice:** Different people present symbolic logic in different ways and include different content. In particular, I don't require knowledge of Rules of Replacement, like De Morgan's Law. I will test you only on the content in the textbooks for this course. If you watch a video that discusses something not in the

- [Symbols & Translation \(Thorsby\)](#)
- [Negation](#) (\sim)
- [Disjunction](#) (\vee)
- [Compound Sentences](#)
- [Conjunction](#) ($\&$)
- [Conditional](#) (if-then; \rightarrow)
- [Truth Functions \(Thorsby\)](#) [negation, conjunction, disjunction, conditional]
- [Modus Ponens](#)
- [Modus Tollens](#)


books, I encourage you to skip them. Watching content not covered in this course can easily confuse you. The best practice will be to try Tomassi Exercises & keep checking answers. It'll be hard at first, but the only way to get better is practice. Always check your answers and learn from mistakes.

✓ **Advice:** Practice the hardest proofs you can, even when you're not ready. If you get stuck, no problem! Just check the answer and keep going. As you practice, the hardest ones become easier. If you can do the hardest ones, you know you can do anything.

- [Rules of Implication I \(Thorsby\)](#) [Modus Ponens, Modus Tollens, Hypothetical Syllogism (conditional), Disjunctive Syllogism]
- [Rules of Implication II \(Thorsby\)](#) [Steps for proofing, disjunctions, conjunction (&I), simplification (&E), addition (\vee I)].
- [Conjunction Introduction](#) [&I]
- [Simplification](#) [Conjunction Elimination, &E]
- [Intro to Proofs](#)
- [Conditional Proof](#) [CP]
- [Conditional Proof \(Thorsby\)](#) [Assumption, CP, discharge].
- [Intro to Truth Tables](#)
- [Truth Tables](#)
- [Truth Table Practice](#)
- [Truth Tables for Propositions \(Thorsby\)](#)
- [Truth Tables for Arguments \(Mark Thorsby\)](#)

FRIDAY
OCTOBER
25

9. Propositional Logic (PL) Proofs

- [Tomassi](#) 3.I–VIII (\approx 30pp.).
- Quiz 9
-  **Test 2: Units 1–9**

- [Double Negation](#) [DNE, DNI]
- [Disjunct Introduction](#) [\vee I]
- [Disjunct Elimination](#) [\vee E]
- [Indirect Proof \(Thorsby\)](#) [Thorsby's Indirect Proof (IP) = Tomassi's Reductio ad Absurdum (RAA)].
- [Proof by Contradiction / Indirect Proof](#) [Reductio (RAA)]

FRIDAY
NOVEMBER
1

10. First-Order Predicate Logic (aka. Quantificational Logic (QL))

- [Tomassi](#) 5.I, III–X (\approx 40pp.).
- Quiz 10

- [Universal and Existential Quantifiers](#)
- [Predicate Logic: Symbols & Translation \(Thorsby\)](#)
- [Relations and Overlapping Quantifiers](#)

FRIDAY
NOVEMBER
8

11. Quantificational Logic (QL) Proofs

- [Tomassi](#) 6.I–III, V (\approx 29pp.).
- Quiz 11

- [Predicate Logic: Using the Rules of Inference \(Thorsby\)](#) [“Generalize” = Universal Introduction (UI) & Existential Introduction (EI). “Instantiation” = Universal Elimination (UE) & Existential Elimination (EE). Note Thorsby EG = Tomassi EI. Thorsby UG = Tomassi UI. Thorsby's UI = Tomassi's UE. Thorsby's EI = Tomassi's EE.]
- [Universal Elimination](#) [UE]
- [Universal Introduction](#) [UI]
- [Existential Introduction](#) [EI]
- [Existential Elimination](#) [EE]

FRIDAY
NOVEMBER
15

12. Strategies

- [Tomassi](#) 6.VI, VIII–IX (\approx 18pp.).
- Quiz 12

✓ **Advice:** I encourage you to practice as much as you can from now until Test 3. Procrastination leads to poor grades.

- [Predicate Logic: Condition & Indirect Proof \(Thorsby\)](#) [Conditional Proof (CP): Thorsby IP = Tomassi Reductio (RAA)].
- [Relational Logic Symbolizing](#)

FRIDAY
NOVEMBER
22

13. Practice & Review Week

✓ **Advice:** You can take the test early if you want. This may also be a good time to start on Extra Credit.

FRIDAY
DECEMBER
6

-  **Test 3: All Units**



FINAL EXAMS WEEK



-  All Extra Credit Due

Feedback: Please consider giving providing constructive feedback or encouragement at tjacobs.com/contact. This is entirely optional. Also, I would love to continue communicating with you about your intellectual journey. Feel free to ask me anything about critical thinking, ethics and morality, the meaning of life, or your life problems. You may contact me anytime in the future as well.

Syllabus Modifications

The instructor reserves the right to modify the syllabus at any time during the semester and will promptly notify students in writing, typically by e-mail, of any such changes.

Instructor's Practices and Procedures

Missed Assignments

Not accepted except in medical emergencies. Excuses will be handled on a case-by-case basis.

Academic Integrity

Plagiarism fails the course.

Here's the link to the HCC information about academic integrity (Scholastic Dishonesty and Violation of Academic Scholastic Dishonesty and Grievance):

<http://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-procedures/>

Other Instructional Resources

Tutoring

HCC provides free, confidential, and convenient academic support, including writing critiques, to HCC students in an online environment and on campus. Tutoring is provided by HCC personnel in order to ensure that it is contextual and appropriate. Visit the [HCC Tutoring Services](#) website for services provided.

Libraries

The HCC Library System consists of 9 libraries and 6 Electronic Resource Centers (ERCs) that are inviting places to study and collaborate on projects. Librarians are available both at the libraries and online to show you how to locate and use the resources you need. The libraries maintain a large selection of electronic resources as well as collections of books, magazines, newspapers, and audiovisual materials. The portal to all libraries' resources and services is the HCCS library web page at <http://library.hccs.edu>.

Supplementary Instruction

Supplemental Instruction is an academic enrichment and support program that uses peer-assisted study sessions to improve student retention and success in historically difficult courses. Peer Support is provided by students who have already succeeded in completion of the specified course, and who earned a grade of A or B. Find details at <http://www.hccs.edu/resources-for/current-students/supplemental-instruction/>.

PHILOSOPHY Program Information

Add program-specific information such as the following:

- PHIL Majors
- Careers in PHIL
- HCC PHIL Student Organizations
- PHIL Scholarships

Provide details for each OR include links to the information

HCC Policies

Here's the link to the HCC Student Handbook

<http://www.hccs.edu/resources-for/current-students/student-handbook/> In it you will find information about the following:

- Academic Information
- Academic Support
- Attendance, Repeating Courses, and Withdrawal
- Career Planning and Job Search
- Childcare
- disAbility Support Services
- Electronic Devices
- Equal Educational Opportunity
- Financial Aid TV (FATV)
- General Student Complaints
- Grade of FX
- Incomplete Grades
- International Student Services
- Health Awareness
- Libraries/Bookstore
- Police Services & Campus Safety
- Student Life at HCC
- Student Rights and Responsibilities
- Student Services
- Testing
- Transfer Planning
- Veteran Services

EGLS³

The EGLS³ ([Evaluation for Greater Learning Student Survey System](#)) will be available for most courses near the end of the term until finals start. This brief survey will give invaluable information to your faculty about their teaching. Results are anonymous and will be available to faculty and division chairs after the end of the term. EGLS³ surveys are only available for the Fall and Spring semesters. -EGLS3 surveys are not offered during the Summer semester due to logistical constraints.

<http://www.hccs.edu/resources-for/current-students/egls3-evaluate-your-professors/>

Campus Carry Link

Here's the link to the HCC information about Campus Carry:

<http://www.hccs.edu/departments/police/campus-carry/>

HCC Email Policy

When communicating via email, HCC requires students to communicate only through the HCC email system to protect your privacy. If you have not activated your HCC student email account, you can go [to HCC Eagle ID](#) and activate it now. You may also use Canvas Inbox to communicate.

Housing and Food Assistance for Students

Any student who faces challenges securing their foods or housing and believes this may affect their performance in the course is urged to contact the Dean of Students at their college for support. Furthermore, please notify the professor if you are comfortable in doing so.

This will enable HCC to provide any resources that HCC may possess.

Office of Institutional Equity

Use the link below to access the HCC Office of Institutional Equity, Inclusion, and Engagement (<http://www.hccs.edu/departments/institutional-equity/>)

disAbility Services

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including long and short term conditions, mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to

<http://www.hccs.edu/support-services/disability-services/>

Title IX

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross
Director EEO/Compliance
Office of Institutional Equity & Diversity
3100 Main

(713) 718-8271

Houston, TX 77266-7517 or Institutional.Equity@hccs.edu

<http://www.hccs.edu/departments/institutional-equity/title-ix-know-your-rights/>

Office of the Dean of Students

Contact the office of the Dean of Students to seek assistance in determining the correct complaint procedure to follow or to identify the appropriate academic dean or supervisor for informal resolution of complaints.

<https://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-complaints/speak-with-the-dean-of-students/>

Department Chair Contact Information

Helen Graham, Ed.D.

713-718-7258

Codwell Hall room, 125

555 Community College Dr.

Houston, TX 77013

<http://learning.hccs.edu/faculty/helen.graham>