# IE4322:SImulation ANd OPtimization

SPring 2024

## INstructor INformation

### INstructor(s)

BRian HUff

### OFficeNUmber

420-N WOolf HAll

### OFfice TElephone NUmber

(817-272-3092

### EMail ADdress

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### FAculty PRofile

WWw.uta.edu/academics/faculty/profile?username=bhuff

### OFfice HOurs(Spring2024)

WEdnesday,3:00PMTO4:00PM

TUesday ANd THursday,1:00PMTO2:00PM

OTher TImes BY APpointment

NOTE: PLease E-mail ME IN ADvance TO INdicate THat YOu WOuld LIke TO MEet FOr OFfice HOurs. PLease PUt “IE4322 OFfice HOurs” IN THe SUbject LIne OF YOur E-mail.

## COurseINformation

### SEctionINformation

* IE4322 SEction 001

### TIMe ANd PLace OF CLass MEetings

* COBA 336,TUesday - THursday,11:00AM TO12:20AM.

### DEscription OF COurse COntent

PRovides THe BAsics OF GEneral TEchnology, IDentifies THe SKills NEeded FOr SUccessful SImulation PRojects, ANd INtroduces A SImulation PAckage.TOPics INclude TEchnical ASpects ANd TErminology OF SImulation (Including CLassification OF DIfferent TYpes OF SImulation), SImulation ANd SImulation PRoject PRocesses ANd THeir EXecution WIth A FOcus ON HAnds ON SImulation PRoject DEsign, MOdel DEvelopment, VErification, ANd VAlidation, INput ANd OUtput ANalysis USing SPecial PUrpose SImulation SOftware PAckages.

### STudent LEarning OUtcomes

AT THe ENd OF THis COurse STudents SHould BE ABle TO (1) UNderstand THeBAsic COncepts OFSImulation, (2) APply THosE COncepts ANd USe SImulation SOftware TO BUild MOdels ANd PErform SYstem ANalysis, ANd (3)TO HAve EAch STudent IN THe CLass FEel COnfident THat HE OR SHe CAn LEad A SUccessful SImulation PRoject IN AN INdustrial SEtting.

### REquired TExtbooks ANd OTherCOurse MAterials

* *LEarning WITNESS*, LAnner GRoup, INc., 1998.– PRovide ON CAnvas
* *SImio ANd SImulation: MOdeling, ANalysis, APplications*BY SMithANdSTurrock,6Th EDition, SImio LLC. FRee DIgital VErsions OF THe TExt ARe AVailable AT HTtps://textbook.simio.com/SASMAA/
* PRocess SImulation USing WItness BY AL-Aomar, WIlliams, ANd ULgen, PRint ISBN:9780470371695 |Online ISBN:9781119019770 |DOI:10.1002/9781119019770, COpyright © 2015 JOhn WIley & SOns, INc
* SImulation SOftware WIll BE PRovided ON CLassroom COmputers FOr STudents USage. HOwever, IT IS REcommended THat STudents ALso OBtain SOftware PAckages (Instructions WIll BE PRovided) FOr INstallation ON THeir LAptops.

### DEscriptions OF MAjOR ASsignments ANd EXaminations

* ONe SEmester-long SImulation PRoject
* THreeTEsts
* HOmeworkANd CLass PArticipation OPportunities

### TEchnology REquirements

IN THis CLass WE WIll BE USing CAnvas TO GAin ACcess TO CLass MAterials ANd SUbmit CLass ASsignments.

TEams WIll BE USed TO STream ANd REcord CLass SEssions. NOte: THis IS A FAce-to-face CLass. CApturing WOrk WRitten ON THe BLack BOard OR THrough THe USe OF A DOcument CAmera IS DIfficult ANd NOt OF HIgh QUality. PLease DO NOt REly ON CLass REcordings AS YOur PRimary MEans OF VIewing THe CLass MAterial. IN SHort, COme TO CLass.

ALl TEsts ANd EXams WIll BE TAken IN THE CLASS ROOM USing THe CAnvas SYstem. YOuCAn USe THe LAboratory COmputers, OR YOuWIll NEed TO BRing A FULlyCHarged LAptop COmputer TO CLass ON TEst DAys WIth A FUnctioning VErsion OF REspondus LOckdown BRowser.IF A PErsonal COmputer IS USed, THeSTudent IS REsponsible FOr PRoviding THeir OWn FUnctioning LAptop COmputer CApable OF OPening ANd HOsting CAnvas QUizzes USing THe REspondus LOckdown BRowser ON TEst ANd EXam DAys.

STudents CAn ACcess TUtorials ON THese TOols BY CLicking ON THe “Get STarted” BOx ON THeir CAnvas HOmepage.

THe CLass PRoject WIll REquire YOu TO SUbmit A MIcrosoft WOrd DOcument FOr THe FInal REport. STudents WIll ALso NEed TO USe THe MICrosoft EXcel APplication TO DEvelop MUlti-year CAshflows.YOu WIll NEed DRawing TOols FOr GRaphically REpresenting PRocess FLows. YOu WIll PErform MOst OF YOur PRoject’s DIscrete-event ANalysis USing EIther THe SImio OR WItness SOftware PRoducts.

**CLass PRerequisites:**

* IE 3314 ANd IE 4315.

## GRadingINformation

### GRading

* FIrst TEst (20% OF CLass GRade)
* SEcond TEst (20% OF THe CLass GRade)
* FInal EXam (25% OF THe CLass GRade)
* SImulation PRoject (25% OF THe CLass GRade)-
* HOmework ANd CLass PArticipation (10% OF THe CLass GRade)
  + 100 TO 90% - A
  + 89.9 TO 80% - B
  + 79.9 TO 70% - C
  + 69.9 TO 60% - D
  + BElow 60% - F

*THere IS NO OTher COurse CRedit AVailable, ANd STudents FRequently REgret NOt SUbmitting ALl HOmework ANdTAking PArt IN CLass PArticipation ACtivities.*

*STudents ARe EXpected TO KEep TRack OF THeir PErformance THroughout THe SEmester ANd SEek GUidance FRom AVailable SOurces (Including THe INstructor) IF THeir PErformance DRops BElow SAtisfactory LEvels.*

**MAke-up EXams/ LAte WOrk SUbmissions**

IF YOu MIss TEst 1 OR TEst 2, THe TEst CAn BE MAde UP BY TAking AN OPtional COmprehensive TEst SCheduled IN THe SAme TIme PEriod AS TEst 3 (The CLass FInal EXam). IF YOu MIss BOth TEst 1 AND TEst 2 YOu WIll BE ASsigned A ZEro FOr ONe OF THe TEsts. LAte SUbmission OF THe PRoject REport IS SUbject TO A 20% REduction OF POints PEr DAy. CAnvas-Based CLass PArticipation ACtivities WIll NOt BE ACcepted PAst THeir STated DUe DAtes.

### EXpeCTations FOr OUt-of-Class STudy

BEyond THe TIme REquired TO ATtend EAch CLass MEeting, STudents ENrolled IN THis COurse SHould EXpect TO SPend AT LEast AN ADditional 9 HOurs PEr WEek OF THeir OWn TIme IN COurse-related ACtivities, INcluding REading REquired MAterials, COmpleting ASsignments, PReparing FOr EXams, ETc.

### GRade GRievancES

ANy APpeal OF A GRade IN THis COurse MUst FOllow THe PROcedures ANd DEadlinesFOr GRade-relatedGRievancesASPUblished IN THe CUrrentUNiversity CATalog.

**WEbsite:**CAnvas(Http://elearn.uta.edu)

**CAnvasHElp:**RIchard ZErcher; EMail:[zercher@uta.edu](mailto:zercher@uta.edu)

**ECho 360 HElp:**FOR PRoblems VIewing CLassRev (Echo360) REcordings COntact CLassroomsupport@uta.edu.

## COurseSChedule

|  |  |  |  |
| --- | --- | --- | --- |
|  | Date (T/TH) | Lecture Period (80 minutes) | Topic |
|  | Week 1 | Lecture 1 | Introduction to Simulation |
|  | Week1 | Lecture 2 |  |
|  | Week 2 | Lecture 3 | Kinds of Simulation |
|  | Week 2 | Lecture 4 | Basics of Queuing Theory and Simulation Exercise |
|  | Week 3 | Lecture 5 | Modeling Entities, Buffers, and Static Resources |
|  | Week 3 | Lecture 6 | Representing and Modeling Stochasticity |
|  | Week 4 | Lecture 7 | Representing Shared Resources & Labor |
|  | Week 4 | Lecture 8 | The Simulation Project Methodology |
|  | Week 5 | Exam 1 |  |
|  | Week 5 | Lecture 9 | Introduction to Class Project |
|  | Week 6 | Lecture 10 | Modeling Planned & Random Activity Interruptions |
|  | Week 6 | Lecture 11 | Modeling the movement of Entities |
|  | Week 7 | Lecture 12 | The structure of a Simulation Execution Engine |
|  | Week 7 | Lecture 13 | Manual Simulation Examples |
|  | Week 8 | Lecture 14 | Modeling Conveyors |
|  | Week 8 | Lecture 15 | Class Project Discussion |
|  | Week 9 | Spring Break |  |
|  | Week 9 | Spring Break |  |
|  | Week 10 | Lecture 16 | Using Entity Attributes & System Variables |
|  | Week 10 | Lecture 17 | Advanced Modeling Logic |
|  | Week 11 | Lecture 18 | Class Project Discussion & Test Review |
|  | Week 11 | Exam 2 |  |
|  | Week 12 | Lecture 19 | Output Analysis |
|  | Week 12 | Lecture 20 | Output Analysis |
|  | Week 13 | Lecture 21 | Simulation Experimentation |
|  | Week 13 | Lecture 22 | Simulation Experimentation |
|  | Week 14 | Lecture 23 | Class Project Discussion |
|  | Week 14 | Lecture 24 | Establishing a Simulation Capability in an Organization |
|  | Week 15 | Lecture 25 | Entity-Based Routing |
|  | Week 15 | Lecture 26 | Hierarchical System Modeling & User-defined modeling constructs |
|  | Week 16 | Lecture 27 | Class Project Discussion & Test Review |
|  | Week 16 | Class Project Due | April 30 – Last Day of class |
|  | Week 17 | Final Exam | Tuesday, May 7 at 11 – 1:30 p.m.. |
|  |  |  |  |

*AS THe INstructor FOr THis COurse, I REserve THe RIght TO ADjust THis SChedule IN ANy WAy THat SErves THe EDucational NEeds OF THe STudents ENrolled IN THis COurse. –Brian L. HUff*

## INStitutionINformation

UTA STUDents ARe ENcouraged TO REview THe BElow INstitutional POlicies ANd INformational SEctions ANd REach OUt TO THe SPecific OFfice WIth ANy QUestions.TO VIewTHisINstitutional INformation, PLeaseVIsit THe[Institutional Information](https://resources.uta.edu/provost/course-related-info/institutional-policies.php)PAge(HTtps://resources.uta.edu/provost/course-related-info/institutional-policies.php)WHich INcludes THe FOllowing POliciesAMong OThers:

* DRop POlicy
* DIsability ACcommodations
* TItle IXPOlicy
* ACademic INtegrity
* STudent FEedback SURvey
* FInal EXam SChedule

## ADditionalINformation

### FAce COvering POlicy

*IN MY CLasses, IF A STudent FEels THey NEed TO WEar A FAce COvering FOr A HEalth RElated REason, THey ARe FRee TO DO SO. IF A STudent NEeds ACcommodations TO ENsure SOcial DIstancing IN THe CLassroom DUe TO BEing AT HIgh RIsk THey ARe ENcouraged TO WOrk DIrectly WIth THe STudent ACcess ANd REsource CEnter TO ASsist IN THese ACcommodations.IF STudents NEed MAsks, THey MAy OBtain THem AT THe CEntral LIbrary, THe E.H. HEreford UNiversity CEnter’s FRont DEsk OR IN THeir DEpartment.*

### ATtendance

AT THe UNiversity OF TExas AT ARlington, TAking ATtendance IS NOt REquired BUt ATtendance IS A CRitical INdicator OF STudent SUccess. EAch FAculty MEmber IS FRee TO DEvelop HIs OR HEr OWn MEthods OF EValuating STudents’ ACademic PErformance, WHich INcludes EStablishing COurse-specific POlicies ON ATtendance.**IN THis CLassATtendance IS REquired.**CLass ATtendance MAy BE TAkenSPoradically.PHysical CLass ATtendance MAy BECOunted AS PArtOF THisCLass’sHOmework ANd CLass PArticipationGRade.

WHIle UT ARlington DOes NOt REquire INstructors TO TAke ATtendance IN THeir COurses, THe U.S. DEpartment OF EDucation REquires THat THe UNiversity HAve A MEchanism IN PLace TO MArk WHen FEderal STudent AId REcipients “Begin ATtendance IN A COurse.” UT ARlington INstructors WIll REport WHen STudents BEgin ATtendance IN A COurse AS PArt OF THe FInal GRading PRocess. SPecifically, WHen ASsigning A STudent A GRade OF F, FAculty REport MUst THe LAst DAte A STudent ATtended THeir CLass BAsed ON EVidence SUch AS A TEst, PArticipation IN A CLass PRoject OR PResentation, OR AN ENgagement ONline VIa CAnvas. THis DAte IS REported TO THe DEpartment OF EDucation FOr FEderal FInancial AId REcipients.

**ACademic INtegrity:**STudents ENrolled IN ALl UTA COurse ARe EXpected TO ADhere TO THe UT ARlington HOnor COde:

*I PLedge, ON MY HOnor, TO UPhold UT ARlington’s TRadition OF ACademic INtegrity, A TRadition THat VAlues HArd WOrk ANd HOnest EFfort IN THe PUrsuit OF ACademic EXcellence.*

*I PRomise THat I WIll SUbmit ONly WOrk THat I PErsonally CReate OR COntribute TO GRoup COllaborations, ANd I WIll APpropriately REference ANy WOrk FRom OTher SOurces. I WIll FOllow THe HIghest STandards OF INtegrity ANd UPhold THe SPirit OF THe HOnor COde.*

UT ARlington FAculty MEmbers MAy EMploy THe HOnor COde IN THeir COurses BY HAving STudents ACknowledge THe HOnor COde AS PArt OF AN EXamination OR REquiring STudents TO INcorporate THe HOnor COde INto ANy WOrk SUbmitted. PEr UT SYstem REgents’ RUle 50101, §2.2, SUspected VIolations OF UNiversity’s STandards FOr ACademic INtegrity (Including THe HOnor COde) WIll BE REferred TO THe OFfice OF STudent COnduct. VIolators WIll BE DIsciplined IN ACcordance WIth UNiversity POlicy, WHich MAy REsult IN THe STudent’s SUspension OR EXpulsion FRom THe UNiversity. ADditional INformation IS AVailable AT<https://www.uta.edu/conduct/>.

### EMergency EXit PRocedures

SHould WE EXperience AN EMergency EVent THat REquires EVacuation OF THe BUilding, STudents SHould EXit THe ROom ANd MOve TOward THe NEarest EXit.TUrn LEft, ANd MOve FOrward. THere WIll BE A STaIRcase ON YOur RIght. WAlk DOwnTHree FLights OFSTairs. ANEXit TO THe OUtside OFTHe BUilding SHould BE IN FRont OF YOu OR ON YOur RIght, BEhind YOu.IF THat STaircase IS BLocked ORCOngested,TURn RIght AS YOu LEave THe CLassroom.WAlk TO THe ENd OF THe HAllway. YOu WIll SEe A STaircase ON YOur LEft.WAlk DOwn THe STairs UNtil YOu SEe AN EXit OUt OF THe BUildingIN FRontOF YOu.

WHen EXiting THe BUilding DUring AN EMergency, DO NOt TAke AN ELevator BUt USe THe STairwells INstead. FAculty MEmbers ANd INstructional STaff WIll ASsist STudents IN SElecting THe SAfest ROute FOr EVacuation ANd WIll MAke ARrangements TO ASsist INdividuals WIth DIsabilities.

STudentsAReENcouraged TO SUbscribe TO THe MAvAlert SYstem THat WIll SEnd INformation IN CAse OF AN EMergency TO THeir CEll PHones OR EMail ACcounts. ANyone CAn SUbscribe AT[Emergency Communication System](https://www.uta.edu/uta/emergency.php).

### STudent SUccess PRogramS

UT ARlington PRovides A VAriety OF REsources ANd PRograms DEsigned TO HElp STudents DEvelop ACademic SKills, DEal WIth PErsonal SItuations, ANd BEtter UNderstand COncepts ANd INformation RElated TO THeir COurses.REsources INclude[tutoring by appointment](http://www.uta.edu/studentsuccess/learning-center/utsi/tutoring/index.php),[drop-in tutoring](https://www.uta.edu/ideas/services/index.php),[etutoring](https://www.etutoring.org/login.cfm?institutionid=388&returnPage),[supplemental instruction](http://www.uta.edu/studentsuccess/learning-center/utsi/supplemental-instruction/index.php),[mentoring](https://www.uta.edu/ideas/services/mentoring/index.php)(Time MAnagement, STudy SKills, ETc.),[success coaching](http://www.uta.edu/studentsuccess/success-programs/success-coaching.php),[TRIO Student Support Services](http://www.uta.edu/studentsuccess/learning-center/sss/index.php), ANd[student success workshops](http://www.uta.edu/studentsuccess/success-programs/success-series-workshops.php).FOr ADditional INformation, PLease EMail[resources@uta.edu](mailto:resources@uta.edu),OR VIew THe[Maverick Resources](http://www.uta.edu/studentsuccess/success-programs/programs/resource-hotline.php)WEbsite.

**THe**[**IDEAS Center**](https://www.uta.edu/ideas/)(Https://www.uta.edu/ideas/)**(**2NDFLoor OF CEntral LIbrary) OFfers**FREE**[tutoring](https://www.uta.edu/ideas/services/tutoring/index.php)ANd[mentoring](https://www.uta.edu/ideas/services/mentoring/index.php)TO ALl STudents WIth A FOcus ON TRansfer STudents, SOphomores, VEterans ANd OThers UNdergoing A TRansition TO UT ARlington. STudents CAn DRop IN OR CHeck THe SChedule OF AVailable PEer TUtors AT WWw.uta.edu/IDEAS, OR CAll (817) 272-6593.

### THe ENGlish WRiting CEnter (411LIBR)

THe WRiting CEnter OFfers**FREE**TUtoring IN 15-, 30-, 45-, ANd 60-minute FAce-to-face ANd ONline SEssions TO ALl UTA STudents ON ANy PHase OF THeir UTA COursework. REgister ANd MAke APpointments ONline ATTHe[Writing Center](https://uta.mywconline.com/)(HTtps://uta.mywconline.com). CLassroom VIsits, WOrkshops, ANd SPecialized SErvices FOr GRaduate STudents ANd FAculty ARe ALso AVailable. PLease SEe[Writing Center: OWL](http://www.uta.edu/owl)FOr DEtailed INformation ON ALl OUr PRograms ANd SErvices.

THe LIbrary’s 2NDFLoor[Academic Plaza](http://library.uta.edu/academic-plaza)(Http://library.uta.edu/academic-plaza) OFfers STudents A CEntral HUb OF SUpport SErvices, INcluding IDEAS CEnter, UNiversity ADvising SErvices, TRansfer UTA ANd VArious COllege/school ADvising HOurs. SErvices ARe AVailable DUring THe[library’s hours](https://library.uta.edu/hours)OF OPeration.

### LIbrarian TO COntact

EAch ACademic UNit HAs ACcess TO[Librarians by Academic Subject](http://www.uta.edu/library/help/subject-librarians.php)THat CAn ASsist STudents WIth REsearch PRojects, TUtorials ON PLagiarism ANd CItation REferences AS WEll AS SUpport WIth DAtabases ANd COurse REserves.

## EMergency PHone NUmbers

IN CAse OF AN ON-campus EMergency, CAll THe UT ARlington POlice DEpartment AT**817-272-3003**(Non-campus PHone),**2-3003**(Campus PHone). YOu MAy ALso DIal 911. NOn-emergency NUmber 817-272-3381

## LIBraryINformation

### REsearch OR GEneral LIbraryHElp

ASk FOr HElp

* [Academic Plaza Consultation Services](https://library.uta.edu/academic-plaza)(LIbrary.uta.edu/academic-plaza)
* [Ask Us](http://ask.uta.edu/)([ask.uta.edu/](http://ask.uta.edu/))
* [Research Coaches](https://library.uta.edu/subject-librarians)(HTtp://libguides.uta.edu/researchcoach)

REsources

* [Library Tutorials](https://library.uta.edu/how-to)([library.uta.edu/how-to](http://library.uta.edu/how-to))
* [Subject and Course Research Guides](https://libguides.uta.edu/)([libguides.uta.edu](http://libguides.uta.edu/))
* [Librarians by Subject](https://library.uta.edu/subject-librarians)(LIbrary.uta.edu/subject-librarians)
* [A to Z List of Library Databases](https://libguides.uta.edu/az.php)(LIbguides.uta.edu/az.php)
* [Course Reserves](https://uta.summon.serialssolutions.com/#!/course_reserves)(HTtps://uta.summon.serialssolutions.com/#!/course\_reserves)
* [Study Room Reservations](https://openroom.uta.edu/)(OPenroom.uta.edu/)

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