

New Program Code       Replace Program Code      Date: \_\_\_\_\_

**REQUESTOR CONTACT INFORMATION**

Name \_\_\_\_\_ Campus \_\_\_\_\_  
 Title \_\_\_\_\_ Email \_\_\_\_\_  
 Office/Dept \_\_\_\_\_ Phone \_\_\_\_\_

**NEW PROGRAM CODE TO CREATE**

Institution \_\_\_\_\_ Campus \_\_\_\_\_  
 Level \_\_\_\_\_ Effective Term \_\_\_\_\_

	Code (Max. Characters)	Description	Check if requesting new code:
College	(2) _____	_____	<input type="checkbox"/> See Banner form STV_COLL
Department	(4) _____	_____	<input type="checkbox"/> See Banner form STV_DEPT
Degree/Certificate	(6) _____	_____	<input type="checkbox"/> See Banner form STV_DEGC
Major	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR
Concentration	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR
Minor	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR

If a similar major/concentration code exists in Banner, please list the code: \_\_\_\_\_

Justification to warrant a new major/concentration code similar to an existing major/concentration code:  
 \_\_\_\_\_

Is this major/concentration code being used the same way at the other UH campuses?  Yes  No

Should this program be available for applicants to select as their planned course of study on the online application? *If yes, student may select the code as their only program of study.*  Yes  No

**RULES PERTAINING TO FINANCIAL AID AND 150% DIRECT SUBSIDIZED LOAN LIMIT LEGISLATION**

Is 50% or greater of the classes in this program offered at a location other than the Home Campus?  Yes  No

Is this program/major/certificate financial aid eligible?  Yes  No

Does this certificate qualify as a Gainful Employment Program (Title IV-eligible certificate program)?  Yes  No

See <http://www.ifap.ed.gov/GainfulEmploymentInfo/index.html>

**Program Length**

*In academic years; decimals are acceptable. The length of the program should match what is published by the campus in any online and/or written publication.*

Special Program Designations  A  B  N  P  T  U

See *Special Program Designations Code Definitions on IRAO Program Code Request webpage*

Required Terms of Enrollment:  Fall  Spring  Summer  Extended

**EXISTING PROGRAM CODE TO REPLACE, IF APPLICABLE**

Program Code _____	Program Description _____
Institution _____	Campus _____
College _____	Department _____
Level _____	

Are current students "grandfathered" under the program code?  Yes  No

Should the old program code be available for use in Banner?  Yes  No

**Effective** , **old program code will no longer be available to admit or recruit students.**

Term (ie. Fall 2020)

*This will turn off the online application, recruitment (effects Banner forms SRASUMI and SRAQUIK) and admissions (effects Banner forms SAADCRV, SAAADMS, SAASUMI, SAAQUIK, and SAAQUAN) Banner modules.*

**Effective** , **old program code will no longer be available to award degree to students.**

Term (ie. Fall 2020)

*This will turn off the general student (effects Banner form SGASTDN) and academic history (effects Banner form SHADEGR) Banner modules.*

**ATTACHMENTS**

**BOR Approved:** Sole-credential Certificate, Associate, Bachelor and Graduate Degrees, and sole credential certificates

- BOR Meeting Minutes & Supporting Documents  Curriculum

**Chancellor Approved:** Concentrations, Certificates and Associate in Technical Studies (ATS) Degree

- Memo from Chancellor to notify Vice President for Academic Planning and Policy regarding program action.
- Curriculum

**CERTIFICATES ONLY: Please check one (1) statement.** This certificate is a...

BOR approved certificate. BOR Meeting/Approval Date: \_\_\_\_\_

Chancellor approved within an authorized BOR program. BOR Program: \_\_\_\_\_

Chancellor approved CO in accordance with UHCCP 5.203, Section IV.B.10.

**VERIFICATIONS**

*By signing below, I verify that I have reviewed and confirm the above information that is pertinent to my position.*

<p><b>Registrar</b> (Print Name)</p> <p>_____</p>	<p><b>Financial Aid Officer</b> (Print Name)</p> <p>_____</p>	<p><b>For Community Colleges, verification of consultation with OVPCC Academic Affairs:</b> Tammi Oyadomari-Chun</p> <p>_____</p>
Signature	Date	Signature
Signature	Date	Signature
Date	Date	Date

**ADDITIONAL COMMENTS**



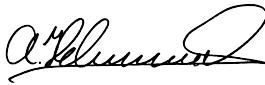
UNIVERSITY  
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College of Natural Sciences  
Office of the Dean

April 7, 2021

MEMORANDUM

TO: Laura E. Lyons  
Associate Vice Chancellor for Academic Affairs

FROM: Aloysius Helminck  
Dean, College of Natural Sciences 

SUBJECT: CONCENTRATION CODES FOR COLLEGE OF NATURAL SCIENCES DEGREE TRACKS

SPECIFIC ACTION REQUESTED:

It is requested that concentration codes be created for formal tracks within College of Natural Sciences' degree programs, and that they be notated on student transcripts.

REQUESTED EFFECTIVE TERM:

Fall 2021

RATIONALE/PURPOSE OF PROPOSED CHANGE(S):

To formalize the procedures for recognizing approved tracks within the BS in Mathematics, BA in Information and Computer Sciences, and BS in Computer Science degrees. This will ensure consistent documentation of students' programs of study and support more effective student data tracking practices across programs.

Tracks Requesting Codes:

- BS Mathematics – Data Science
- BS Mathematics – General
- BA Information and Computer Sciences – Security Science
- BA Information and Computer Sciences – Information Technology (stop out effective Fall 2021)
- BA Information and Computer Sciences – General Track
- BS Computer Science- Data Science
- BS Computer Science – Security Science
- BS Computer Science – General

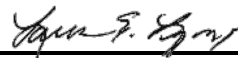
BACKGROUND:

There have been ongoing discussions with the Office of Vice Chancellor of Academic Affairs, Office of the Registrar, CNS Academic Affairs, and the CNS Student Academic Success Center, and the decision to request concentration codes for all approved tracks was the recommended course of action.

ACTION RECOMMENDED:

It is recommended that concentration codes be created for tracks within College of Natural Sciences' degree programs, and that they be notated on student transcripts.

✓  
APPROVED/DISAPPROVED:

  
Laura E. Lyons  
Associate Vice Chancellor for Academic Affairs

14 April 2021

Date

2565 McCarthy Mall, Keller Hall Suite 201  
Honolulu, Hawai'i 96822  
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Fax: (808) 956-9111  
natsci.manoa.hawaii.edu

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**Attachments:**

Approval for tracks in BS Math degree

Approval for tracks in BA ICS and BS CSCI degrees

Approval for additional track in BS CSCI degree

Approval for stop out of the IT track in BA ICS degree

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UNIVERSITY of HAWAI'I MĀNOA

Colleges of Arts and Sciences College of Natural Sciences Office of the Dean

MEMORANDUM

June 7, 2018

TO: Michael Bruno Interim Vice Chancellor for Academic Affairs and Vice Chancellor for Research

FROM: Aloysius Helminck Dean [Signature]

SUBJECT: Program Modification for the B.S. in Mathematics, Creation of a track in Data Science

Please find attached a proposal to modify the program requirements for the Bachelor of Science (B.S.) degree in Mathematics. The request is to create a track in Data Science, while retaining the current BS as a 'general' track.

The proposal was reviewed and passed by the College of Natural Sciences Program & Curriculum Committee on March 13, 2018. We apologize for the tardiness of this submission to the OVCAA. The CNS Dean's Office, Department of Information & Computer Sciences, and the Department of Mathematics have been collaboratively working to ensure that this request reflects the uniqueness of the proposed Data Science track in Mathematics relative to the track recently approved for the B.S. in Computer Science.

APPROVED [Signature] Michael Bruno Interim Vice Chancellor for Academic Affairs and Vice Chancellor for Research

Effective Date: Spring 2019 [Signature] Date

cc: Andrew Taylor, CNS Associate Dean Lynne Higa, CNS Dean's Office Ralph Freese, Mathematics Les Wilson, Mathematics

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RECEIVED

18 JUL -3 P 3:23

Date: June 28, 2018

To: Michael Bruno  
Interim Vice Chancellor for Academic Affairs and Vice Chancellor of Research

Via: Aloysius Helminck, Dean  
College of Natural Sciences *A. Helminck*

From: Ralph Freese *Ralph Freese*  
Chair, Department of Mathematics

Subject: Creation of a Data Sciences Track in the Mathematics BS degree

The faculty of the Department of Mathematics (MATH) requests to establish an official Track in Data Science for the BS in Mathematics.

The program changes to achieve this effective starting in the Spring 2019 semester are:

For the Data Science track, students will be required to take Math 301, 407, 442, 471, 472 for their five elective Math 300-479 courses, ICS 111 and 314 as prerequisites and ICS 211, 311 and 435 for nine of their required 15 credits in "additional mathematics courses numbered above 300 to 479 or appropriate non-introductory courses in related fields."

The Data Science track adds the following prerequisite or required courses:

- MATH 301 "Introduction to Discrete Mathematics"
- MATH 407 "Numerical Analysis"
- MATH 442 "Vector Analysis"
- MATH 471 "Probability"
- MATH 472 "Statistical Inference"
- ICS 111 "Introduction to Computer Science I"
- ICS 211 "Introduction to Computer Science II"
- ICS 311 "Algorithms"
- ICS 435 "Machine Learning Fundamentals"

Mathematicians with training in Data Science are in high demand both locally and nationally. The faculty in Math wants to provide students with the opportunity to enter this growing field of data

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science with all the skills and knowledge they need to be successful in their future career. The faculty also wishes to provide academic offerings useful to the new Hawaii Data Science Institute. The Math Department consulted with the ICS department in the early stage of development of this new track. Math intends to continue a close collaboration with ICS in the implementation and operation of the new track.

All the required courses are currently being offered by the two departments on a regular basis. The availability of the Math and ICS courses has been discussed with the ICS department. MATH 301 is currently offered once every three semesters; if we need to offer it once every two semesters that will be a small increase in our overall teaching load

The current and modified UHM catalog entries are shown below. The program sheet and sample 4-year plan are also attached.

### Current Catalog Entry:

#### BS Degree

#### Requirements

Students must complete PHYS 170/170L and PHYS 272/272L, as well as MATH 244, or MATH 253A, and must complete 24 credit hours in mathematics courses numbered between 300 to 479 and 15 credit hours in additional mathematics courses numbered above 300 to 479 or appropriate non-introductory courses in related fields including:

- MATH 311 or MATH 307
- MATH 321
- MATH 331
- 6 credit hours in a writing-intensive mathematics course
- 6 credit hours in courses numbered above 400
- Students must also complete MATH 480
- Only courses in which a student earns a grade of C (not C-) or better will be counted toward fulfillment of major requirements
- A cumulative 2.0 GPA in all completed upper division mathematics courses is required
- All mathematics majors are required to see a mathematics advisor each spring semester prior to fall registration

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Students must demonstrate an understanding of algorithms and logic, as well as precision of thinking.

For information on a Bachelor Degree Program Sheet, go to [www.manoa.hawaii.edu/ovcaa/programsheets/](http://www.manoa.hawaii.edu/ovcaa/programsheets/).

**Proposed Catalog Entry** (in which we have also removed the last two bullet points, the last one because it is not a major requirement and the second to last one is a change we have proposed in a separate memo):

### **BS Degree**

#### **Requirements**

Students must complete PHYS 170/170L and PHYS 272/272L, as well as MATH 244, or MATH 253A, and must complete 24 credit hours in mathematics courses numbered between 300 to 479 and 15 credit hours in additional mathematics courses numbered above 300 to 479 or appropriate non-introductory courses in related fields including:

- MATH 311 or MATH 307
- MATH 321
- MATH 331
- 6 credit hours in a writing-intensive mathematics course
- 6 credit hours in courses numbered above 400
- Students must also complete MATH 480
- Only courses in which a student earns a grade of C (not C-) or better will be counted toward fulfillment of major requirements

Students must demonstrate an understanding of algorithms and logic, as well as precision of thinking.

For information on a Bachelor Degree Program Sheet, go to [www.manoa.hawaii.edu/ovcaa/programsheets/](http://www.manoa.hawaii.edu/ovcaa/programsheets/).

#### **Data Sciences Track:**

In satisfying the above BS requirements, students must include the following courses:

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- Math 301, 407, 442, 471, 472
- ICS 211, 311, 314, 435

Note: Substitution must be approved by the Mathematics Department.

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**University of Hawai'i at Mānoa**  
**Colleges of Arts & Sciences Program Sheet 2018-2019**  
**Bachelor of Science (BS) in Mathematics, Data Science Track**  
**Admissions: Open Process: Declaration**  
**Min. Total Credits: 120 (113 in core & major + 7 in electives)**

UHM General Education Core Requirements
<b>Foundations</b>
<input type="checkbox"/> FW ENG 100, 100A, 190, ESL 100, or AMST 111
<input type="checkbox"/> FQ* MATH 241 or 251A
<input type="checkbox"/> FG (A / B / C)
<input type="checkbox"/> FG (A / B / C)
<i>*Note: This requirement changed in Fall 2018. If you entered the UH System prior to that, please see your college/school advisor.</i>
<b>Diversification</b>
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DB
<input type="checkbox"/> DP PHYS 170, CHEM 161, 162
<input type="checkbox"/> DY PHYS 170L, CHEM 161L, 162L
<input type="checkbox"/> DS
<input type="checkbox"/> DS
<i>* See degree, college and major requirements for courses that can also fulfill these.</i>
UHM Graduation Requirements
<b>Focus</b>
<input type="checkbox"/> H
<input type="checkbox"/> E (300+)
<input type="checkbox"/> O (300+) MATH 480
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W (300+) MATH 321
<input type="checkbox"/> W (300+) MATH 331
<b>Hawaiian / Second Language</b>
<input type="checkbox"/> 101
<input type="checkbox"/> 102
<input type="checkbox"/> 201
<input type="checkbox"/> 202
<b>Credit Minimums</b>
• 120 total applicable
• 30 in residence at UHM
• 45 upper division (300+ level) credits
<b>Grade Point Average</b>
• 2.0 cumulative or higher ( <i>Note: Other GPAs may be required.</i> )
• Good academic standing

Bachelor of Science Requirements
<input type="checkbox"/> Calculus I
<input type="checkbox"/> Calculus II
<input type="checkbox"/> Chemistry I with lab
<input type="checkbox"/> Chemistry II with lab
<input type="checkbox"/> Physics I with lab
<input type="checkbox"/> Physics II with lab
<i>Refer to major requirements for the specific courses that satisfy these requirements.</i>
College Requirements
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

*This program sheet was prepared to provide information and does not constitute a contract. See back for major requirements.  
 Meet regularly with your major advisor.*

**Major Requirements for BS in Mathematics**

Admission: Open

Application: NA

Min. major credits: BS = 44 (68 with related requirements)

Min. exit GPA: 2.0 GPA in the major

Min. C grade (not C-) in courses

**Requirements****Mathematics Prerequisites Requirements (11 credits)** MATH 241\*<sup>FQ</sup> or 251A\*<sup>FQ</sup> MATH 242 or 252A MATH 243 or 253A**Related Mathematics Requirements (13 credits)** PHYS 170\*<sup>DP</sup> /  170L\*<sup>DY</sup> PHYS 272\*<sup>DP</sup> /  272L\*<sup>DY</sup> ICS 111**Mathematics Courses (44 credits; see department for approved courses; see catalog for prerequisites)** MATH 244 or 253A

Students must demonstrate an understanding of algorithms and logic, as well as precision of thinking. Courses that satisfy this requirement are MATH 190, 301, 304L, 305L, 407; CEE 417; EE 160; ICS 110C, 110D, 111, 211; GG 250; ME 360; PHYS 305.

24 core credits in MATH 300-479 courses:

 MATH 311 or 307 MATH 321 MATH 331 MATH 301 MATH 407 MATH 442 MATH 471 MATH 472

15 related credits of additional MATH 300-479 or approved non-introductory courses in natural or information sciences:

 ICS 211 ICS 311 ICS 314 ICS 435

The following requirements must be fulfilled in regards to the 39 above credits (check completed):

 6 credit hours in writing-intensive mathematics courses 6 credit hours in courses numbered above 400 2 credits in MATH 480 (CR/NC only) (Spring only, last semester)

Substitution allowed: (ICS 141 and ICS 241) can be a substitution for MATH 301 in the Data Science Track only. In that case, students must take another 300+ level math course and another 300+ level course for one of the diversification courses (DA/DH/DL or DS).

**Additional Mathematics Restrictions***Only one of MATH 307 and 311 may be counted toward major requirements.**Mandatory advising each semester prior to registration.***Notes**Student Academic Success Center: Keller 213; (808) 956-5911; [cnsadvis@hawaii.edu](mailto:cnsadvis@hawaii.edu); [www.hawaii.edu/natsci/advising](http://www.hawaii.edu/natsci/advising)Mathematics Department: Keller 401-A; (808) 956-4680; [office@math.hawaii.edu](mailto:office@math.hawaii.edu); [www.math.hawaii.edu](http://www.math.hawaii.edu)

Mathematics Undergraduate Advisor: Keller 419; (808) 956-4679

There may be exceptions to the major requirements listed above. Please schedule an advising appointment with Undergraduate Advising personnel, for more detailed information.

# University of Hawaii at Mānoa – Four-Year Academic Plan 2018-2019

## Colleges of Arts and Sciences

### Bachelor of Science (BS) in Mathematics, Data Science Track

This is a sample academic plan. Students should meet with an academic advisor prior to registration to formulate their own plan.

Year 1		Year 2		Year 3		Year 4	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
MATH 241 or 251A (FO) ICS 111 FG (A/B/C) FW		MATH 243 or 253A MATH 321 PHYS 170 (DP) PHYS 170L (DY) DS		MATH 331 CHEM 161 CHEM 161L ICS 314 Elective 300+ HSL 101		MATH 442 MATH 471 ICS 435 Elective 300+ HSL 201	
4 4 3 3		3 3 4 1 3		3 3 3 1 3 3		3 3 1 3 3 3	
Credits	14	Credits	14	Credits	16	Credits	15
MATH 242 or 252A MATH 301 ICS 211 DA/DH/DL FG (A/B/C)		MATH 244 or 253A MATH 311 or 307 PHYS 272 PHYS 272L DA/DH/DL DS		MATH 300+ or 400+ ICS 311 CHEM 162 CHEM 162L Elective 300+ HSL 102		MATH 407 MATH 472 MATH 480 DB HSL 202	
4 3 4 3 3		3 3 3 1 3 3		3 3 3 3 1 3		3 3 3 2 3 3	
Credits	17	Credits	16	Credits	14	Credits	14
Summer	Summer	Summer	Summer	Summer	Summer	Summer	Summer
Credits	0	Credits	0	Credits	0	Credits	0
Total Credits	31	Total Credits	61	Total Credits	91	Total Credits	120

**Notes:**

- Students without appropriate AP or transfer credits must take placement exams to be able to register for CHEM 161 and MATH 241.
- Students must see a Mathematics advisor prior to registration to discuss their academic plan options.
- Substitution allowed: (ICS 141 and ICS 241) can be a substitution for MATH 301 in the Data Science Track only. In that case students must take another 300+ level Math course and another 300+ level course for one of the diversification courses (DA/DH/DL or DS).



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Colleges of Arts and Sciences  
College of Natural Sciences  
Office of the Dean

MEMORANDUM

March 19, 2018

TO: Michael Bruno  
Interim Vice Chancellor for Academic Affairs and  
Vice Chancellor for Research

FROM: Aloysius Helminck  
Dean

SUBJECT: REVISED Program Modification for the B.S. in Computer Science,  
Creation of a track in *Data Science*

Please find attached a revision to the proposal (dated February 2018) to modify the program requirements for the Bachelor of Science (B.S.) degree in Computer Science. The request is to create a third official track in *Data Science*.

The proposal was reviewed and passed by the College of Natural Sciences Program & Curriculum Committee on February 23, 2018. The committee also approved the creation of ICS 434 (Data Science Fundamentals) and ICS 438 (Big Data Analytics) and the UHM-1 forms are simultaneously routing their way through the UHM review and approval process.

APPROVED / DISAPPROVED:

Effective Date: Spring 2019

\_\_\_\_\_  
Michael Bruno  
Interim Vice Chancellor for Academic Affairs and  
Vice Chancellor for Research

5/3/18  
\_\_\_\_\_  
Date

cc: Andrew Taylor, CNS Associate Dean  
Lynne Higa, CNS Dean's Office  
Scott Robertson, Information & Computer Sciences  
Guylaine Poisson, Information & Computer Sciences

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**Memorandum**

Date: February 14, 2018

To: Michael Bruno, Interim Vice Chancellor  
Academic Affairs

Via: Aloysius Helminck, Dean  
College of Natural Sciences

From: Scott Robertson, Department, Chair  
Information & Computer Sciences

Three handwritten signatures in black ink. The top signature is the most prominent and appears to be 'A. Helminck'. Below it are two other signatures, one of which is clearly 'Scott Robertson'.

RE: Undergraduate Program change: Creation of a Data Science track for BS in Computer Science degree

The faculty of the Department of Information and Computer Sciences (ICS) requests the establishment of an official Track in Data Science for the BS in Computer Science.

The program changes to achieve this **effective starting in the Fall 2018 semester** are:

- For the BS in Computer Sciences program we will add a Data Science track. The required courses are 111, 211, 212, **235**, 311, 314, 321, **434, 435, 438, 484, MATH 301, MATH 307, MATH 372.**

The Data Science track adds the following required courses:

- ICS 235 “Machine Learning Methods”
- ICS 434 “Data Science Fundamentals”
- ICS 435 “Machine Learning Fundamentals”
- ICS 438 “Big Data Analytics”
- ICS 484 “Data Visualization” and
- MATH 301 “Introduction to Discrete Mathematics”,
- MATH 307 “Linear Algebra and Differential Equations”
- MATH 372 “Elementary Probability and Statistics”

The Data Science track removes the following required courses:

- ICS 141 “Discrete Mathematics for Computer Science I”
- ICS 241 “Discrete Mathematics for Computer Science II”
- ICS 332 “Operating Systems”
- and Two 300-level courses

# Bachelor of Science (BS) in Computer Science Data Science Track

Program Sheet 2019-2020

Min. Total Credits: 120 (114 in core & major + 6 in electives)

UHM General Education Core Requirements	
<b>Foundations</b>	
<input type="checkbox"/> FW	
<input type="checkbox"/> FS (MATH 215 or 241)	
<input type="checkbox"/> FG (A / B / C)	
<input type="checkbox"/> FG (A / B / C)	
<b>Diversification</b>	
<input type="checkbox"/> DA / DH / DL	
<input type="checkbox"/> DA / DH / DL	
<input type="checkbox"/> DB	
<input type="checkbox"/> DP (PHYS 151 or 170)	
<input type="checkbox"/> DY (PHYS 151L or 170L)	
<input type="checkbox"/> DS	
<input type="checkbox"/> DS	
<i>* See degree, college and major requirements for courses that can also fulfill these.</i>	
UHM Graduation Requirements	
<b>Focus</b>	
<input type="checkbox"/> H	
<input type="checkbox"/> E (300+)	
<input type="checkbox"/> O (300+)	
<input type="checkbox"/> W	
<input type="checkbox"/> W	
<input type="checkbox"/> W	
<input type="checkbox"/> W (300+)	
<input type="checkbox"/> W (300+)	
<b>Hawaiian / Second Language</b>	
<input type="checkbox"/> 101	
<input type="checkbox"/> 102	
<input type="checkbox"/> 201	
<input type="checkbox"/> 202	
<b>Credit Minimums</b>	
• 120 total applicable	
• 30 in residence at UHM	
• 45 upper division (300+ level) credits	
<b>Grade Point Average</b>	
• 2.0 cumulative or higher ( <i>Note: Other GPAs may be required.</i> )	
• Good academic standing	

Degree Requirements
<b>Bachelor of Science Requirements</b>
<input type="checkbox"/> MATH 215* <sup>FS</sup> or 241* <sup>FS</sup>
<input type="checkbox"/> MATH 242
<input type="checkbox"/> CHEM 161* <sup>DP</sup> / <input type="checkbox"/> 161L* <sup>DY</sup>
<input type="checkbox"/> CHEM 162* <sup>DP</sup> / <input type="checkbox"/> 162L* <sup>DY</sup>
<input type="checkbox"/> PHYS 151* <sup>DP</sup> or 170* <sup>DP</sup> / <input type="checkbox"/> 151L* <sup>DY</sup> or 170L* <sup>DY</sup>
<input type="checkbox"/> PHYS 152* <sup>DP</sup> or 272* <sup>DP</sup> / <input type="checkbox"/> 152L* <sup>DY</sup> or 272L* <sup>DY</sup>
<b>College Requirements</b>
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

*This program sheet was prepared to provide information and does not constitute a contract.  
See back for major requirements.  
Meet regularly with your major advisor.*



**Major Requirements for BS in Computer Science Data Science Track**

Admission: Open

Application: NA

Min. major credits: BS = 54

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

**Requirements**

- To enroll in all courses requiring Calculus II as their prerequisite (ICS 311, MATH 307, and MATH 372), students must take MATH 242 for their Calculus II requirement.
- MATH 215 or 241 (Calculus I) is a prerequisite for MATH 242. However, students must meet the grade requirement B (not B-) or better in MATH 215 to enroll in MATH 242.

**Required Courses (45 credits)**

- ICS 111 minimum "B" (not "B-") grade or higher to advance
- ICS 211 minimum "B" (not "B-") grade or higher to advance
- ICS 212
- ICS 235 (Fall only)
- ICS 311
- ICS 314
- ICS 321
- ICS 434
- ICS 435
- ICS 438
- ICS 484 (Spring only)
- MATH 301
- MATH 307
- MATH 372

 **BS Computer Science Data Science only (9 credits)**

The courses may include ICS courses or courses from other departments as long as they are approved by an ICS advisor and meet the minimum total of 9 credit hours.

- Data Science Elective 400+ approved by ICS advisor
- Data Science Elective 400+ approved by ICS advisor
- Data Science Elective 400+ approved by ICS advisor

**Substitution allowed: (ICS 141 and ICS 241) can be a substitution for MATH 301 in the Data Science Track only. In that case, students must take a 300+ level course for one of the diversification courses (DA/DH/DL or DS).**

**Notes**

College Advising: Student Academic Success Center; Keller 213; (808) 956-5911; [csadvis@hawaii.edu](mailto:csadvis@hawaii.edu); [www.hawaii.edu/natsci/advising](http://www.hawaii.edu/natsci/advising)

Information and Computer Sciences Department: POST 317; (808) 956-7420; [icsinfo@hawaii.edu](mailto:icsinfo@hawaii.edu); [www.ics.hawaii.edu](http://www.ics.hawaii.edu)

ICS Undergraduate Advisor: Gerald Lau; POST 303A; (808) 956-5428; [glau@hawaii.edu](mailto:glau@hawaii.edu)

## University of Hawai'i at Mānoa – Four-Year Academic Plan 2019-2020

### Bachelor of Science (BS) in Computer Science Data Science Track

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
<b>Fall</b>		<b>Fall</b>		<b>Fall</b>		<b>Fall</b>	
ICS 111	4	ICS 212	3	ICS 321	3	ICS 438	3
MATH 215 or 241 (FS)	4	ICS 235	3	ICS 435	3	Data Science Elective 400+	3
FG (A/B/C)	3	MATH 372	3	MATH 307	3	CHEM 161	3
FW	3	HSL 101	3	PHYS 152 or PHYS 272	3	CHEM 161L	1
				PHYS 152L or PHYS 272L	1	DS	3
				HSL 201	3	Elective 300+	3
Credits	14	Credits	12	Credits	16	Credits	16
<b>Spring</b>		<b>Spring</b>		<b>Spring</b>		<b>Spring</b>	
ICS 211	4	ICS 311	4	ICS 434	3	Data Science Elective 400+	3
MATH 301	3	ICS 314	3	ICS 484	3	Data Science Elective 400+	3
MATH 242	4	PHYS 151 or PHYS 170 (DP)	3	DA/DH/DL	3	CHEM 162	3
DA/DH/DL	3	PHYS 151L or PHYS 170L (DY)	1	DB	3	CHEM 162L	1
FG (A/B/C)	3	DS	3	HSL 202	3	Elective 300+	3
		HSL 102	3				
Credits	17	Credits	17	Credits	15	Credits	13
<b>Summer</b>		<b>Summer</b>		<b>Summer</b>		<b>Summer</b>	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<b>31</b>	<b>Total Credits</b>	<b>60</b>	<b>Total Credits</b>	<b>91</b>	<b>Total Credits</b>	<b>120</b>

**Notes:**


- Students must take placement exams to be able to register for CHEM 161 and MATH 215 or 241.
- To enroll in MATH 242, students must meet the grade requirement of B (not B-) or better in MATH 215.
- Substitution allowed: (ICS 141 and ICS 241) can be a substitution for MATH 301 in the Data Science Track only. **In that case, students must take a 300+ level course for one of the diversification courses (DA/DH/DL or DS).**
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) credits are required



August 21, 2017

**MEMORANDUM**

TO: David Chin, Chair  
Department of Information and Computer Sciences

FROM: Michael Bruno,  
Interim Vice Chancellor for Academic Affairs  
and Vice Chancellor for Research 

SUBJECT: Approval of Program Modifications for BA in Information & Computer Sciences, and BS in Computer Sciences

We have reviewed your (revised) requests to modify the following programs:

- BA in Information and Computer Sciences: add tracks in Security Science, and Information Technology
- BS in Computer Sciences: add track in Security Science

Both requests are approved, effective Spring 2018.

Attachments

c: Interim Associate Dean Ranker  
STEM Coordinator Higa  
Registrar Lau  
Catalog Coordinator Nakashima

## Sample Schedule: B.S. in Computer Science

(for students on the 2017-2018 Arts & Sciences College Program Requirements and are declared CS majors)

Attached is a sample schedule for a student seeking a Bachelor of Science (BS) in Computer Science. Please note the following important points:

- **This schedule is only a starting point.** The sample schedule was created to assist you when meeting with your advisor(s) to plan coursework, and does not include all the coursework required for a degree as you are able to “double-dip” some of your requirements. It is more a “point of departure” than a “road map,” and should not be considered a substitute for meeting with your advisor(s) and devising a 4 year plan that matches your interests and goals. You may also attend summer session as a means of getting ahead or completing the coursework shown in the schedule.
- **The sample schedule is only a planning aid. It does not include all the requirements for a degree.** UHM students have an exceptional amount of freedom in crafting their own college experience, choosing from breadth of academic fields, and fulfilling degree requirements using a wide range of course offerings. This freedom invites students to explore connections between fields, engage in co-curricular activities, and develop unique combinations of majors, minors, and certificates. Because of this, it is impossible to provide you with a “one-size-fits-all” schedule. Nevertheless, if used wisely, it can provide you with an excellent starting point for your own, individualized academic plan.
- **You should meet regularly with ICS Department faculty advisors and A&S academic advisors for specific details on the various requirements.** Students must be active partners in the advising process. This responsibility includes researching curricular and co-curricular opportunities, creating educational plans, and discussing those plans with your advisors. You are strongly encouraged to meet with advisors on a yearly basis to confirm that you are still on track.
- **Additional information on CS major requirements that appear on the sample schedule:**
  - The Bachelor of Science (BS) degree offers a solid foundation in computer science and provides students the opportunity to focus in an area of concentration within the computer science field.
  - **Approved substitutions for the calculus, and physics requirements:**
    - MATH 241: Math 215, or Math 251
    - MATH 242: Math 216, or Math 252
    - PHYS 151/151L, or Phys 170/170L
    - PHYS 152/152L, or Phys 272/272L
  - **Junior/Senior Electives:**
    - ICS 400+ electives: five ICS (or approved) 400-level courses, including at most three credits of ICS 499 and six credits of ICS 491.

# Bachelor of Science (BS) in Computer Science

Program Sheet 2017-2018

Min. Total Credits: 120 (108 in core & major + 12 in electives)

111

9

UHM General Education Core Requirements	
<b>Foundations</b>	
<input type="checkbox"/>	FW
<input type="checkbox"/>	FS
<input type="checkbox"/>	FG (A / B / C)
<input type="checkbox"/>	FG (A / B / C)
<b>Diversification</b>	
<input type="checkbox"/>	DA / DH / DL
<input type="checkbox"/>	DA / DH / DL
<input type="checkbox"/>	DB
<input type="checkbox"/>	DP
<input type="checkbox"/>	DY
<input type="checkbox"/>	DS
<input type="checkbox"/>	DS
* See degree, college and major requirements for courses that can also fulfill these.	
UHM Graduation Requirements	
<b>Focus</b>	
<input type="checkbox"/>	H
<input type="checkbox"/>	E (300+)
<input type="checkbox"/>	O (300+)
<input type="checkbox"/>	W
<input type="checkbox"/>	W
<input type="checkbox"/>	W
<input type="checkbox"/>	W (300+)
<input type="checkbox"/>	W (300+)
<b>Hawaiian / Second Language</b>	
<input type="checkbox"/>	101
<input type="checkbox"/>	102
<input type="checkbox"/>	201
<input type="checkbox"/>	202
<b>Credit Minimums</b>	
<input type="checkbox"/>	120 total applicable
<input type="checkbox"/>	30 in residence at UHM
<input type="checkbox"/>	45 upper division (300+ level) credits
<b>Grade Point Average</b>	
<input type="checkbox"/>	2.0 cumulative or higher (Note: Other GPAs may be required.)

<input type="checkbox"/>	Good academic standing
Degree Requirements	
Bachelor of Science Requirements	
<input type="checkbox"/>	MATH 215*FS or 241*FS
<input type="checkbox"/>	MATH 216 or 242
<input type="checkbox"/>	CHEM 161*DP / <input type="checkbox"/> 161L*DY
<input type="checkbox"/>	CHEM 162*DP / <input type="checkbox"/> 162L*DY
<input type="checkbox"/>	PHYS 151*DP or 170*DP / <input type="checkbox"/> 151L*DY or 170L*DY
<input type="checkbox"/>	PHYS 152*DP or 272*DP / <input type="checkbox"/> 152L*DY or 272L*DY
College Requirements	
A & S Options - Complete at least one option	
See degree requirements above.	
Credit Maximums	
<input type="checkbox"/>	8 KRS activity
<input type="checkbox"/>	9 Directed Reading / Research
<input type="checkbox"/>	12 Practicum / Internship

This program sheet was prepared to provide information and does not constitute a contract.

See back for major requirements.

Meet regularly with your major advisor.

**Major Requirements for BS in Computer Science**

Admission: Open

Application: NA

Min. major credits: BS = 51

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

**Requirements****ICS Core Courses (36 credits)**

- ICS 111 minimum "B"(not "B-") grade or higher to advance
- ICS 141\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 211 minimum "B"(not "B-") grade or higher to advance
- ICS 212
- ICS 241\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 311
- ICS 314
- ICS 321
- ICS 332

**Two of:**

- ICS 312 or ICS 331
- ICS 313 or ICS 361
- ICS 351 or ICS 451
- ICS 355 (prereq ICS 222)

 **BS only (15 credits)**

- ICS 400+
- ICS 400+
- ICS 400+
- ICS 400+
- ICS 400+

**Notes**

Information and Computer Sciences Department: POST 317; (808) 956-7420; icsinfo@hawaii.edu; www.ics.hawaii.edu

ICS Undergraduate Advisor: Gerald Lau; POST 303A; (808) 956-5428; glau@hawaii.edu

[http://www.advising.hawaii.edu/artsci/pages/resources/lib\\_art\\_degrees/majorskills/majorskills\\_ics.asp#ICS\\_SCHED](http://www.advising.hawaii.edu/artsci/pages/resources/lib_art_degrees/majorskills/majorskills_ics.asp#ICS_SCHED)

# University of Hawai'i at Mānoa – Four-Year Academic Plan 2017-2018

## Bachelor of Science (BS) in Computer Science

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
Fall		Fall		Fall		Fall	
ICS 111	4	ICS 311	4	ICS 312/331, 313/361, 351/451, or 355	3	ICS 400+ Elective	3
ICS 141	3	ICS 314	3	ICS 312/331, 313/361, 351/451, or 355	3	ICS 400+ Elective	3
MATH 241 (FS)	4	PHYS 151 or PHYS 170	3	DA/DH/DL	3	CHEM 161	3
FW	3	PHYS 151L or PHYS 170L	1	DS	3	CHEM 161L	1
		HSL 101	3	HSL 201	3	Elective 300+	3
						Elective 300+	3
Credits	14	Credits	14	Credits	15	Credits	16
Spring		Spring		Spring		Spring	
ICS 211	4	ICS 212	3	ICS 332	3	ICS 400+ Elective	3
ICS 241	3	ICS 321	3	ICS 400+ Elective	3	ICS 400+ Elective	3
MATH 242	4	PHYS 152 or PHYS 272	3	DB	3	CHEM 162	3
FG (A/B/C)	3	PHYS 152L or PHYS 272L	1	DA/DH/DL 300+ ✓	3	CHEM 162L	1
DS	3	FG (A/B/C)	3	HSL 202	3	Elective 300+	3
		HSL 102	3				
Credits	17	Credits	16	Credits	15	Credits	13
Summer		Summer		Summer		Summer	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<b>31</b>	<b>Total Credits</b>	<b>61</b>	<b>Total Credits</b>	<b>91</b>	<b>Total Credits</b>	<b>120</b>

**Notes:**

- Students must take placement exams to be able to register for CHEM 161 and MATH 215 or 241.
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) are required.

Rev 6/17

## Sample Schedule: B.S. in Computer Science Security Science Track

(for students on the 2017-2018 Arts & Sciences College Program Requirements and are declared CS majors)

Attached is a sample schedule for a student seeking a Bachelor of Science (BS) in Security Science. Please note the following important points:

- **This schedule is only a starting point.** The sample schedule was created to assist you when meeting with your advisor(s) to plan coursework, and does not include all the coursework required for a degree as you are able to “double-dip” some of your requirements. It is more a “point of departure” than a “road map,” and should not be considered a substitute for meeting with your advisor(s) and devising a 4 year plan that matches your interests and goals. You may also attend summer session as a means of getting ahead or completing the coursework shown in the schedule.
- **The sample schedule is only a planning aid. It does not include all the requirements for a degree.** UHM students have an exceptional amount of freedom in crafting their own college experience, choosing from breadth of academic fields, and fulfilling degree requirements using a wide range of course offerings. This freedom invites students to explore connections between fields, engage in co-curricular activities, and develop unique combinations of majors, minors, and certificates. Because of this, it is impossible to provide you with a “one-size-fits-all” schedule. Nevertheless, if used wisely, it can provide you with an excellent starting point for your own, individualized academic plan.
- **You should meet regularly with ICS Department faculty advisors and A&S academic advisors for specific details on the various requirements.** Students must be active partners in the advising process. This responsibility includes researching curricular and co-curricular opportunities, creating educational plans, and discussing those plans with your advisors. You are strongly encouraged to meet with advisors on a yearly basis to confirm that you are still on track.
- **Additional information on CS major requirements that appear on the sample schedule:**
  - This Bachelor of Science (BS) degree offers a solid foundation in computer science with a focus in cyber security. This degree provides student with opportunity to focus in this area of concentration within the computer science field.
  - **Approved substitutions for the calculus, and physics requirements:**
    - MATH 241: Math 215, or Math 251
    - MATH 242: Math 216, or Math 252
    - PHYS 151/151L, or Phys 170/170L
    - PHYS 152/152L, or Phys 272/272L



# Bachelor of Science (BS) in Computer Science / Security Science Track

Program Sheet 2017-2018

Min. Total Credits: 120 (108 in core & major + 12 in electives)

112

8

UHM General Education Core Requirements
<b>Foundations</b>
<input type="checkbox"/> FW
<input type="checkbox"/> FS
<input type="checkbox"/> FG (A / B / C)
<input type="checkbox"/> FG (A / B / C)
<b>Diversification</b>
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DB
<input type="checkbox"/> DP
<input type="checkbox"/> DY
<input type="checkbox"/> DS
<input type="checkbox"/> DS
<i>* See degree, college and major requirements for courses that can also fulfill these.</i>
<b>UHM Graduation Requirements</b>
<b>Focus</b>
<input type="checkbox"/> H
<input type="checkbox"/> E (300+)
<input type="checkbox"/> O (300+)
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W (300+)
<input type="checkbox"/> W (300+)
<b>Hawaiian / Second Language</b>
<input type="checkbox"/> 101
<input type="checkbox"/> 102
<input type="checkbox"/> 201
<input type="checkbox"/> 202
<b>Credit Minimums</b>
• 120 total applicable
• 30 in residence at UHM
• 45 upper division (300+ level) credits
<b>Grade Point Average</b>
• 2.0 cumulative or higher ( <i>Note: Other GPAs may be required.</i> )
• Good academic standing

Degree Requirements
<b>Bachelor of Science Requirements</b>
<input type="checkbox"/> MATH 215*FS or 241*FS
<input type="checkbox"/> MATH 216 or 242
<input type="checkbox"/> CHEM 161*DP / <input type="checkbox"/> 161L*DY
<input type="checkbox"/> CHEM 162*DP / <input type="checkbox"/> 162L*DY
<input type="checkbox"/> PHYS 151*DP or 170*DP / <input type="checkbox"/> 151L*DY or 170L*DY
<input type="checkbox"/> PHYS 152*DP or 272*DP / <input type="checkbox"/> 152L*DY or 272L*DY
<b>College Requirements</b>
<b>A &amp; S Options - Complete at least one option</b>
See degree requirements above.
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

*This program sheet was prepared to provide information and does not constitute a contract.  
See back for major requirements.  
Meet regularly with your major advisor.*

**Major Requirements for BS in Computer Science with Security Science Track**

Admission: Open

Application: NA

Min. major credits: BS = ~~34~~ 48

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

**Requirements**

**ICS Core Courses (36 credits)**

- 4  ICS 111 minimum "B"(not "B-") grade or higher to advance
- 3  ICS 141\*FS minimum "B"(not "B-") grade or higher to advance
- 4  ICS 211 minimum "B"(not "B-") grade or higher to advance
- 3  ICS 212
- 30 } 3  ICS 241\*FS minimum "B"(not "B-") grade or higher to advance
- 4  ICS 311
- 3  ICS 314
- 3  ICS 321
- 3  ICS 332

**The following two:**

- 4  ICS 351 or ICS 451
- 4  ICS 355 (prereq ICS 222)

**BS Computer Science Security Science only (12 credits)**

- ICS423, ICS425, ICS426, ICS455, ICS495, EE406
- ICS423, ICS425, ICS426, ICS455, ICS495, EE406
- ICS423, ICS425, ICS426, ICS455, ICS495, EE406
- ICS423, ICS425, ICS426, ICS455, ICS495, EE406

**Notes**

Information and Computer Sciences Department: POST 317; (808) 956-7420; icsinfo@hawaii.edu; www.ics.hawaii.edu

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[http://www.advising.hawaii.edu/artsci/pages/resources/lib\\_art\\_degrees/majorskills/majorskills\\_ics.asp#ICS\\_SCHED](http://www.advising.hawaii.edu/artsci/pages/resources/lib_art_degrees/majorskills/majorskills_ics.asp#ICS_SCHED)

# University of Hawai'i at Mānoa – Four-Year Academic Plan 2017-2018

## Bachelor of Science (BS) in Computer Science with Security Science Track

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
Fall		Fall		Fall		Fall	
ICS 111	4	ICS 311	4	ICS 351 or 451	3	ICS 423, 425, 426, 455, 495, or EE 406	3
ICS 141	3	ICS 314	3	ICS 321	3	ICS 423, 425, 426, 455, 495, or EE 406	3
MATH 241 (FS)	4	PHYS 151 or PHYS 170	3	DA/DH/DL	3	CHEM 161	3
FW	3	PHYS 151L or PHYS 170L	1	DS <del>300+</del>	3	CHEM 161L	1
		HSL 101	3	HSL 201	3	DA/DH/DL 300+	3
						Elective 300+	3
Credits	14	Credits	14	Credits	15	Credits	16
Spring		Spring		Spring		Spring	
ICS 211	4	ICS 212	3	ICS 423, 425, 426, 455, 495, or EE 406	3	ICS 423, 425, 426, 455, 495, or EE 406	3
ICS 241	3	ICS 355	3	<del>ICS 351 or 451</del>	<del>3</del>	CHEM 162	3
MATH 242	4	PHYS 152 or PHYS 272	3	DB	3	CHEM 162L	1
FG (A/B/C)	3	PHYS 152L or PHYS 272L	1	DS	3	Elective 300+	2
<u>ICS 222</u>	3	FG (A/B/C)	3	HSL 202	3	Elective 300+	3
		HSL 102	3	<u>ICS 332</u>	3		
Credits	17	Credits	16	Credits	<del>15</del> 16	Credits	<del>12</del> 13
Summer		Summer		Summer		Summer	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<b>31</b>	<b>Total Credits</b>	<b>61</b>	<b>Total Credits</b>	<del>94</del> 91	<b>Total Credits</b>	<del>122</del> 120

**Notes:**

- Students must take placement exams to be able to register for CHEM 161 and MATH 215 or 241.
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) credits are required.

38

15

Rev 6/17

10  
15  
21  
46

## Sample Schedule: ~~General~~ B.A. in Information & Computer Sciences

(for students on the 2017-2018 Arts & Sciences College Program Requirements and are declared ICS majors)

*General  
Track*

Attached is a sample schedule for a student seeking a Bachelor of Arts (B.A.) in Information & Computer Sciences. Please note the following important points:

- **This schedule is only a starting point.** The sample schedule was created to assist you when meeting with your advisor(s) to plan coursework, and does not include all the coursework required for a degree as you are able to "double-dip" some of your requirements. It is more a "point of departure" than a "road map," and should not be considered a substitute for meeting with your advisor(s) and devising a 4 year plan that matches your interests and goals. You may also attend summer session as a means of getting ahead or completing the coursework shown in the schedule.
- **The sample schedule is only a planning aid. It does not include all the requirements for a degree.** UHM students have an exceptional amount of freedom in crafting their own college experience, choosing from breadth of academic fields, and fulfilling degree requirements using a wide range of course offerings. This freedom invites students to explore connections between fields, engage in co-curricular activities, and develop unique combinations of majors, minors/certificates and their coursework in general. Because of this, it is impossible to provide you with a "one-size-fits-all" schedule. Nevertheless, if used wisely, it can provide you with an excellent starting point for your own, individualized academic plan.
- **You should meet regularly with ICS Department faculty advisors and A&S academic advisors for specific details on the various requirements.** Students must be active partners in the advising process. This responsibility includes researching curricular and co-curricular opportunities, creating educational plans, and discussing those plans with your advisors. You are strongly encouraged to meet with advisors on a yearly basis to confirm that you are still on track.
- **Additional information on ICS major requirements that appear on the sample schedule:** The intent of the Bachelor of Arts degree is to allow computer science to be combined with another discipline. Students seeking a BA should write a short (one page or less) proposal specifying the seven courses they will use for their ICS and area concentration electives. The proposal should explain how these courses form a coherent plan of study combining computer science with another field. This course proposal must be approved by an ICS undergraduate advisor and can be modified later with written approval to account for availability of courses or changes in the student's interests (which may require a new proposal and rationale).
- **Junior/Senior Electives:**
  - ICS 400+ electives: complete three ICS (or approved) 400-level courses, including at most three credits of ICS 499 and three credits of ICS 491.
  - Area concentration electives: complete four upper division (300-level or above) courses in some area of concentration (e.g., art, business, music, education).
  - All seven electives must be approved by an ICS advisor.

# ~~General~~ Bachelor of Arts (BA) in Information & Computer Sciences

Program Sheet 2017-2018

*General Track*

Min. Total Credits: 120 (101 in core & major + 19 in electives)

*91*  
*29*

UHM General Education Core Requirements
<b>Foundations</b>
<input type="checkbox"/> FW
<input type="checkbox"/> FS
<input type="checkbox"/> FG (A / B / C)
<input type="checkbox"/> FG (A / B / C)
<b>Diversification</b>
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DB
<input type="checkbox"/> DP
<input type="checkbox"/> DY
<input type="checkbox"/> DS
<input type="checkbox"/> DS
<i>* See degree, college and major requirements for courses that can also fulfill these.</i>
UHM Graduation Requirements
<b>Focus</b>
<input type="checkbox"/> H
<input type="checkbox"/> E (300+)
<input type="checkbox"/> O (300+)
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W (300+)
<input type="checkbox"/> W (300+)
<b>Hawaiian / Second Language</b>
<input type="checkbox"/> 101
<input type="checkbox"/> 102
<input type="checkbox"/> 201
<input type="checkbox"/> 202
<b>Credit Minimums</b>
• 120 total applicable
• 30 in residence at UHM
• 45 upper division (300+ level) credits
<b>Grade Point Average</b>
• 2.0 cumulative or higher ( <i>Note: Other GPAs may be required.</i> )
• Good academic standing

Degree Requirements
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

This program sheet was prepared to provide information and does not constitute a contract.  
 See back for major requirements.  
 Meet regularly with your major advisor.

General Track

Major Requirements for General BA in Information and Computer Sciences

Admission: Open

Application: NA

Min. major credits: BA = 51

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

Requirements

ICS Core Courses (36 credits)

- ICS 111 minimum "B"(not "B-") grade or higher to advance
- ICS 141\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 211 minimum "B"(not "B-") grade or higher to advance
- ICS 212
- ICS 241\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 311
- ICS 314
- ICS 321
- ICS 332

Two of:

- ICS 312 or ICS 331
- ICS 313 or ICS 361
- ICS 351 or ICS 451
- ICS 355 (prereq ICS 222)

General BA only (3 credits)

- ICS 400+

Four upper-division electives in an area of concentration (12 credits):

- 300+
- 300+
- 300+
- 300+

A proposal identifying upper-division elective courses and how they form a coherent plan of study must be approved by an ICS advisor.

Notes

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ICS Undergraduate Advisor: Gerald Lau; POST 303A; (808) 956-5428; glau@hawaii.edu

http://www.advising.hawaii.edu/artsci/pages/resources/lib\_art\_degrees/majorskills/majorskills\_ics.asp#ICS\_SCHED

Please note that for those entering the Bachelor of Arts in Information and Computer Sciences, a proposal is also required when declaring this major.

*change to (AOC)\* 300+*  
*Also hold & put under other major requirements*

## University of Hawai'i at Mānoa – Four-Year Academic Plan 2017-2018 General Bachelor of Arts (BA) in Information and Computer Sciences

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
Fall		Fall		Fall		Fall	
ICS 111	4	ICS 311	(4)	ICS 312/331, 313/361, 351/451, or 355	(3)	ICS 312/331, 313/361, 351/451, or 355	(3)
ICS 141 (FS)	3	ICS 314	(3)	HSL <del>202</del> 201	3	Elective 300+ (AOC)*	(3)
FW	3	HSL <del>102</del> 101	3	Elective 300+ (AOC)*	(3)	Elective <del>300+</del>	3
FG (A/B/C)	3	DS	3	Elective <del>300+</del>	3	Elective 300+	(3)
DA/DH/DL	3	Elective	3	Elective <del>Elective</del>	3	Elective 300+	(2)
Credits	16	Credits	16	Credits	15	Credits	14
Spring		Spring		Spring		Spring	
ICS 211	4	ICS 212	3	ICS 332	(3)	ICS 400+	(3)
ICS 241	3	ICS 321	(3)	DB	3	Elective 300+ (AOC)*	(3)
FG (A/B/C)	3	HSL <del>201</del> 102	3	Elective 300+ (AOC)*	(3)	Elective 300+	(3)
<del>HSL 101</del> Elective	3	DS	3	Elective 300+	(3)	DP	3
DA/DH/DL	3	Elective	3	Elective <u>HSL 202</u>	3	DY	1
Credits	16	Credits	15	Credits	15	Credits	13
Summer		Summer		Summer		Summer	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<b>32</b>	<b>Total Credits</b>	<b>63</b>	<b>Total Credits</b>	<b>93</b>	<b>Total Credits</b>	<b>120</b>

**Notes:**

- Students need to have a degree proposal approved by an ICS advisor prior to declaring ICS.
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) credits are required.

(AOC)\* = Four upper division (300+) electives in an area of concentration in your approved proposal.

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## Sample Schedule: B.A. in Information & Computer Sciences Security Sciences Track

(for students on the 2017-2018 Arts & Sciences College Program Requirements and are declared ICS majors)

Attached is a sample schedule for a student seeking a Bachelor of Arts (B.A.) in Information & Computer Sciences. Please note the following important points:

- **This schedule is only a starting point.** The sample schedule was created to assist you when meeting with your advisor(s) to plan coursework, and does not include all the coursework required for a degree as you are able to “double-dip” some of your requirements. It is more a “point of departure” than a “road map,” and should not be considered a substitute for meeting with your advisor(s) and devising a 4 year plan that matches your interests and goals. You may also attend summer session as a means of getting ahead or completing the coursework shown in the schedule.
- **The sample schedule is only a planning aid. It does not include all the requirements for a degree.** UHM students have an exceptional amount of freedom in crafting their own college experience, choosing from breadth of academic fields, and fulfilling degree requirements using a wide range of course offerings. This freedom invites students to explore connections between fields, engage in co-curricular activities, and develop unique combinations of majors, minors/certificates and their coursework in general. Because of this, it is impossible to provide you with a “one-size-fits-all” schedule. Nevertheless, if used wisely, it can provide you with an excellent starting point for your own, individualized academic plan.
- **You should meet regularly with ICS Department faculty advisors and A&S academic advisors for specific details on the various requirements.** Students must be active partners in the advising process. This responsibility includes researching curricular and co-curricular opportunities, creating educational plans, and discussing those plans with your advisors. You are strongly encouraged to meet with advisors on a yearly basis to confirm that you are still on track.
- **Additional information on ICS major requirements that appear on the sample schedule:** The intent of the Bachelor of Arts degree is to allow computer science to be combined with another discipline. Students seeking a BA should write a short (one page or less) proposal specifying the seven courses they will use for their ICS and area concentration electives. The proposal should explain how these courses form a coherent plan of study combining computer science with another field. This course proposal must be approved by an ICS undergraduate advisor and can be modified later with written approval to account for availability of courses or changes in the student's interests (which may require a new proposal and rationale).
- **Junior/Senior Electives:**
  - ICS 400+ electives: complete three ICS (or approved) 400-level courses, including at most three credits of ICS 499 and three credits of ICS 491.
  - Area concentration electives: complete four upper division (300-level or above) courses in some area of concentration (e.g., art, business, music, education).
  - All seven electives must be approved by an ICS advisor.



# Bachelor of Arts (BA) in Information & Computer Sciences Security Science Track

Program Sheet 2017-2018

Min. Total Credits: 120 (101 in core & major + 19 in electives)

91

29

UHM General Education Core Requirements
<b>Foundations</b>
<input type="checkbox"/> FW
<input type="checkbox"/> FS
<input type="checkbox"/> FG (A / B / C)
<input type="checkbox"/> FG (A / B / C)
<b>Diversification</b>
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DB
<input type="checkbox"/> DP
<input type="checkbox"/> DY
<input type="checkbox"/> DS
<input type="checkbox"/> DS
<i>* See degree, college and major requirements for courses that can also fulfill these.</i>
UHM Graduation Requirements
<b>Focus</b>
<input type="checkbox"/> H
<input type="checkbox"/> E (300+)
<input type="checkbox"/> O (300+)
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W (300+)
<input type="checkbox"/> W (300+)
<b>Hawaiian // Second Language</b>
<input type="checkbox"/> 101
<input type="checkbox"/> 102
<input type="checkbox"/> 201
<input type="checkbox"/> 202
<b>Credit Minimums</b>
• 120 total applicable
• 30 in residence at UHM
• 45 upper division (300+ level) credits
<b>Grade Point Average</b>
• 2.0 cumulative or higher (Note: Other GPAs may be required.)
• Good academic standing

Degree Requirements
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

*This program sheet was prepared to provide information and does not constitute a contract.  
See back for major requirements.  
Meet regularly with your major advisor.*

**Major Requirements for BA in Information and Computer Sciences / Security Science Track**

Admission: Open

Application: NA

Min. major credits: BA = ~~51~~ 48

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

**Requirements****ICS Core Courses (36 credits)**

- ICS 111 minimum "B"(not "B-") grade or higher to advance
- ICS 141\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 211 minimum "B"(not "B-") grade or higher to advance
- ICS 212 or ICS 215
- ICS 241\*FS minimum "B"(not "B-") grade or higher to advance
- ICS 311
- ICS 314
- ICS 321
- ICS 332

**The following two:**

- ICS 351 or ICS 451
- ICS 355 (prereq ICS 222)

**~~BA Security Science Track only (12 credits)~~**

- ~~ICS 423, ICS 425, ICS 426, ICS 455, or ICS 495/EE 406~~
- ~~ICS 423, ICS 425, ICS 426, ICS 455, or ICS 495/EE 406~~
- ~~ICS 423, ICS 425, ICS 426, ICS 455, or ICS 495/EE 406~~
- ~~ICS 423, ICS 425, ICS 426, ICS 455, or ICS 495/EE 406~~

**Notes**Information and Computer Sciences Department: POST 317; (808) 956-7420; icsinfo@hawaii.edu; [www.ics.hawaii.edu](http://www.ics.hawaii.edu)ICS Undergraduate Advisor: Gerald Lau; POST 303A; (808) 956-5428; [glau@hawaii.edu](mailto:glau@hawaii.edu)[http://www.advising.hawaii.edu/artsci/pages/resources/lib\\_art\\_degrees/majorskills/majorskills\\_ics.asp#ICS\\_SCHED](http://www.advising.hawaii.edu/artsci/pages/resources/lib_art_degrees/majorskills/majorskills_ics.asp#ICS_SCHED)

Please note that for those entering the Bachelor of Arts in Information and Computer Sciences, a proposal is also required when declaring this major

# University of Hawai'i at Mānoa - Four-Year Academic Plan 2017-2018

## Bachelor of Arts (BA) in Information and Computer Sciences / Security Science Track

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
<b>Fall</b>		<b>Fall</b>		<b>Fall</b>		<b>Fall</b>	
ICS 111	4	ICS 311	(4)	ICS 321	(3)	ICS 423, 425, 426, 455, 495, or EE406	(3)
ICS 141 (FS)	3	ICS 314	(3)	ICS 332	(3)	ICS 423, 425, 426, 455, 495, or EE406	(3)
FW	3	HSL 102 <del>HSL 101</del>	3	HSL 202 <del>201</del>	3	Elective <del>300+</del>	3
FG (A/B/C)	3	DA/DH/DL <del>Elective</del>	3	Elective <del>300+</del>	3	Elective	3
<del>DA/DH/DL</del>	3	DS	3	Elective 300+	3	Elective 300+	(3)
Credits	16	Credits	16	Credits	15	Credits	15
<b>Spring</b>		<b>Spring</b>		<b>Spring</b>		<b>Spring</b>	
ICS 211	4	ICS 212 <del>or 215</del>	3	ICS 423, 425, 426, 455, 495, or EE406	(3)	ICS 423, 425, 426, 455, 495, or EE406	(3)
ICS 241	3	ICS 355	(3)	ICS 351 or 451	(3)	Elective <del>300+</del> 300+	(3)
FG (A/B/C)	3	HSL 201 <del>102</del>	3		3	Elective 300+	(3)
<del>HSL 101</del> <del>Elective</del>	3	DA/DH/DL	3	DB	3	E	3
ICS 222	3	DS	3	Elective <del>HSL 202</del> <del>Elective 300+</del>	(3)	DP	3
						DY	1
Credits	16	Credits	15	Credits	15	Credits	15
<b>Summer</b>		<b>Summer</b>		<b>Summer</b>		<b>Summer</b>	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<del>29</del> 32	<b>Total Credits</b>	<del>60</del> 63	<b>Total Credits</b>	<del>90</del> 93	<b>Total Credits</b>	120

**Notes:**

- Students need to have a degree proposal approved by an ICS advisor prior to declaring ICS.
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) credits are required.

18

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## Sample Schedule: B.A. in Information & Computer Sciences IT Track

(for students on the 2017-2018 Arts & Sciences College Program Requirements and are declared ICS majors)

Attached is a sample schedule for a student seeking a Bachelor of Arts (B.A.) in Information & Computer Sciences. Please note the following important points:

- **This schedule is only a starting point.** The sample schedule was created to assist you when meeting with your advisor(s) to plan coursework, and does not include all the coursework required for a degree as you are able to "double-dip" some of your requirements. It is more a "point of departure" than a "road map," and should not be considered a substitute for meeting with your advisor(s) and devising a 4 year plan that matches your interests and goals. You may also attend summer session as a means of getting ahead or completing the coursework shown in the schedule.
- **The sample schedule is only a planning aid. It does not include all the requirements for a degree.** UHM students have an exceptional amount of freedom in crafting their own college experience, choosing from breadth of academic fields, and fulfilling degree requirements using a wide range of course offerings. This freedom invites students to explore connections between fields, engage in co-curricular activities, and develop unique combinations of majors, minors/certificates and their coursework in general. Because of this, it is impossible to provide you with a "one-size-fits-all" schedule. Nevertheless, if used wisely, it can provide you with an excellent starting point for your own, individualized academic plan.
- **You should meet regularly with ICS Department faculty advisors and A&S academic advisors for specific details on the various requirements.** Students must be active partners in the advising process. This responsibility includes researching curricular and co-curricular opportunities, creating educational plans, and discussing those plans with your advisors. You are strongly encouraged to meet with advisors on a yearly basis to confirm that you are still on track.
- **Additional information on ICS major requirements that appear on the sample schedule:** The intent of the Bachelor of Arts degree is to allow computer science to be combined with another discipline. Students seeking a BA should write a short (one page or less) proposal specifying the seven courses they will use for their ICS and area concentration electives. The proposal should explain how these courses form a coherent plan of study combining computer science with another field. This course proposal must be approved by an ICS undergraduate advisor and can be modified later with written approval to account for availability of courses or changes in the student's interests (which may require a new proposal and rationale).
- **Junior/Senior Electives:**
  - ICS 400+ electives: complete three ICS (or approved) 400-level courses, including at most three credits of ICS 499 and three credits of ICS 491.
  - Area concentration electives: complete four upper division (300-level or above) courses in some area of concentration (e.g., art, business, music, education).
  - All seven electives must be approved by an ICS advisor.

# Bachelor of Arts (BA) in Information & Computer Sciences / IT Track

Program Sheet 2017-2018

Min. Total Credits: 120 (94 in core & major + 26 in electives)

UHM General Education Core Requirements
<b>Foundations</b>
<input type="checkbox"/> FW
<input type="checkbox"/> FS
<input type="checkbox"/> FG (A / B / C)
<input type="checkbox"/> FG (A / B / C)
<b>Diversification</b>
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DA / DH / DL
<input type="checkbox"/> DB
<input type="checkbox"/> DP
<input type="checkbox"/> DY
<input type="checkbox"/> DS
<input type="checkbox"/> DS
* See degree, college and major requirements for courses that can also fulfill these.
<b>UHM Graduation Requirements</b>
<b>Focus</b>
<input type="checkbox"/> H
<input type="checkbox"/> E (300+)
<input type="checkbox"/> O (300+)
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W
<input type="checkbox"/> W (300+)
<input type="checkbox"/> W (300+)
<b>Hawaiian / Second Language</b>
<input type="checkbox"/> 101
<input type="checkbox"/> 102
<input type="checkbox"/> 201
<input type="checkbox"/> 202
<b>Credit Minimums</b>
• 120 total applicable
• 30 in residence at UHM
• 45 upper division (300+ level) credits
<b>Grade Point Average</b>
• 2.0 cumulative or higher (Note: Other GPAs may be required.)
• Good academic standing

Degree Requirements
<b>Credit Maximums</b>
• 8 KRS activity
• 9 Directed Reading / Research
• 12 Practicum / Internship

**This program sheet was prepared to provide information and does not constitute a contract. See back for major requirements. Meet regularly with your major advisor.**

**Major Requirements for BA in Information and Computer Sciences / IT track**

Admission: Open

Application: NA

Min. major credits: BA = ~~60~~ 51

Min. B (not B-) grade in ICS 111, 141, 211 and 241; min. C grade (not C-) in all other courses

**Requirements**

**ICS Core Courses (30 credits)**

- ICS 111 minimum "B" (not "B-") grade or higher to advance
- ICS 141\*FS minimum "B" (not "B-") grade or higher to advance
- ICS 211 minimum "B" (not "B-") grade or higher to advance
- ICS 212 or ICS 215
- ICS 241\*FS minimum "B" (not "B-") grade or higher to advance
- ICS 311
- ICS 314
- ICS 321
- ICS 332

**BA IT Track only (24 credits)**

- ICS 351 or ICS 451
- ICS 355 (prereq ICS 222)
- ICS 414
- ICS 415
- ICS 425
- ICS 426
- ICS 464

**Notes**

Information and Computer Sciences Department: POST 317; (808) 956-7420; [icsinfo@hawaii.edu](mailto:icsinfo@hawaii.edu); [www.ics.hawaii.edu](http://www.ics.hawaii.edu)

ICS Undergraduate Advisor: Gerald Lau; POST 303A; (808) 956-5428; [glau@hawaii.edu](mailto:glau@hawaii.edu)

[http://www.advising.hawaii.edu/artsci/pages/resources/lib\\_art\\_degrees/majorskills/majorskills\\_ics.asp#ICS\\_SCHED](http://www.advising.hawaii.edu/artsci/pages/resources/lib_art_degrees/majorskills/majorskills_ics.asp#ICS_SCHED)

Please note that for those entering the Bachelor of Arts in Information and Computer Sciences, a proposal is also required when declaring this major

## University of Hawai'i at Mānoa – Four-Year Academic Plan 2017-20178 Bachelor of Arts (BA) in Information and Computer Sciences / IT Track

This is a sample academic plan. You should meet with an academic advisor prior to registration to formulate your own plan.

Year 1		Year 2		Year 3		Year 4	
<b>Fall</b>		<b>Fall</b>		<b>Fall</b>		<b>Fall</b>	
ICS 111	4	ICS 311	4	ICS 414	3	ICS 415	3
ICS 141 (FS)	3	ICS 314	3	ICS 332	3	ICS 426	3
FW	3	HSL <del>102</del> 101	3	HSL 201	3	Elective <del>200+</del>	3
FG (A/B/C)	3	DA/ DH/ DL	3	DS DP	3	Elective <del>300+</del>	3
		DS	3	Elective <del>200+</del>	3	Elective 300+	3
Credits	13	Credits	16	Credits	15	Credits	15
<b>Spring</b>		<b>Spring</b>		<b>Spring</b>		<b>Spring</b>	
ICS 211	4	ICS 321	3	ICS 351 or 451	3	ICS 464	3
ICS 241	3	ICS 355	3	ICS 425	3	Elective <del>200+</del>	3
ICS 222	3	ICS 212 or ICS 215	3	HSL 202	3	Elective	3
FG (A/B/C)	3	HSL 102	3	DB	3	Elective 300+	3
HSL 101 DS	3	DA/ DH/ DL	3	DY	1	Elective 300+	2
				Elective 300+	3		3
Credits	16	Credits	15	Credits	16	Credits	14
<b>Summer</b>		<b>Summer</b>		<b>Summer</b>		<b>Summer</b>	
Credits	0	Credits	0	Credits	0	Credits	0
<b>Total Credits</b>	<b>29</b>	<b>Total Credits</b>	<b>60</b>	<b>Total Credits</b>	<b>91</b>	<b>Total Credits</b>	<b>120</b>

**Notes:**

- Students need to have a degree proposal approved by an ICS advisor prior to declaring ICS.
- Students must incorporate all focus requirements into this plan.
- 45 upper division (300+ level) are required.

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INFORMATION & COMPUTER SCIENCES

UNIVERSITY of HAWAII at MĀNOA

1680 EAST-WEST ROAD, POST 317 · HONOLULU, HI 96822  
TEL: (808) 956-7420 · FAX: (808) 956-3548 · WEB: WWW.ICS.HAWAII.EDU

March 17, 2017

## MEMORANDUM

To: Michael Bruno, Interim Vice Chancellor for Academic Affairs

Via: Aloysius Helminck, Dean, College of Natural Sciences

From: David N. Chin, Chair, ICS

Re: Undergraduate Program Modification for the BS in Computer Science and the BA in Information & Computer Sciences

The faculty of the Department of Information and Computer Sciences (ICS) is pleased to inform you about changes to the BA in Information & Computer Sciences and the BS in Computer Science degree programs **effective starting in the Spring 2018** semester:

1. For both the BA in Information & Computer Sciences program and the BS in Computer Science program, the required courses are changed from 111, 141, 211, 212, 241, 311, 314, 321, 332, **(312 or 331), (313 or 361)** to 111, 141, 211, 212, 241, 311, 314, 321, 332 **and two of 355, (351 or 451), (312 or 331), (313 or 361)**.
2. For both the BA in Information & Computer Sciences program and the BS in Computer Science program (and also the BS in Computer Engineering program), a Security Science (SecSci) Certificate is proposed (see separate document).

The change in the required courses adds the option of ICS 355 “Security and Trust I: Resource Protections” and a group consisting of ICS 351 “Network Design and Management” or ICS 451 “Data Networks”. Cybersecurity in our increasingly networked world is growing in importance in all areas of society with significant implications for workforce development. The rationale for this change is, first and foremost, to emphasize the importance of cybersecurity in the undergraduate computer science curriculum, and, secondly, to enable a tighter integration between the requirements for the SecSci certificate and the requirements of the BA & BS programs. Specifically, ICS 355 and (ICS 351 or ICS 451) are prerequisites to the courses required by the SecSci certificate and with the proposed changes, those prerequisite courses can be used to satisfy the BA & BS requirements as well.

No additional instructional resources are tied to this change, because ICS 355, 351, and 451 are not new courses: these courses are currently being offered by the department on a regular basis.

The modified UHM catalog entry (with additions in red ink and deletions in red strike-through) is shown below:



# Marked-Up Catalog Entry

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## Bachelor's Degree

To be admitted into the program, first-year students entering UH Manoa directly from high school must first be admitted into the Colleges of Arts and Sciences. For continuing students, a cumulative GPA of at least 2.0 is required for admission.

## BA in Information and Computer Sciences

### Requirements

Students pursuing this degree are required to submit a short proposal listing the courses they intend to take to complete their ICS major. An ICS faculty advisor must approve this proposal in writing. Samples of course proposals are available at the ICS department office. Students must complete the following courses (52 credits):

- ICS 111, 141, 211, 212, 241, 311, ~~312 or 331, 313 or 361~~, 314, 321, ~~and 332~~, and two of 355, (351 or 451), (312 or 331), (313 or 361).
- One ICS courses at the 400-level or above,
- Four upper division (300-level or above) courses in some area of concentration. The area of concentration courses do NOT have to be from the same department and can include ICS courses.

For information on a Bachelor Degree Program Sheet, go to [www.manoa.hawaii.edu/ovcaa/programsheets/](http://www.manoa.hawaii.edu/ovcaa/programsheets/).

## BS in Computer Science

### Requirements

Students must complete the following courses (52 credits):

- ICS 111, 141, 211, 212, 241, 311, ~~312 or 331, 313 or 361~~, 314, 321, ~~and 332~~, and two of 355, (351 or 451), (312 or 331), (313 or 361).
- At least five ICS or other approved courses at the 400 level or above

Substitutions are permitted with the written approval of an ICS faculty advisor.

Waiver of certain requirements, such as by Advanced Placement CS Exam, must be approved by the ICS faculty advisor.

For information on a Bachelor Degree Program Sheet, go to [www.manoa.hawaii.edu/ovcaa/programsheets/](http://www.manoa.hawaii.edu/ovcaa/programsheets/).

### Focus Areas

In both the BA and BS, Focus Areas allow students to customize their study paths to suit their personal career goals and interests. Currently supported Focus Areas include:

- Security Science (SecSci) BA or BS

As everyday life increasingly relies on network computation and information, security has become a central problem for ICS. The tasks of protecting security and privacy offer a growing range of employment and business opportunities for ICS graduates— this Focus Area opens up career paths towards this expanding and exciting area. Although computation begins with programming, modern applications often involve physical and social interactions that cannot be programmed or engineered. The processes of security, privacy, and trust, as studied in SecSci, go beyond the engineering aspects of computation and into computer science as a genuine science.

- Information Technology (IT) BA only

The IT focus prepares students to work in practical areas such as system and network administration, where the most employment opportunities in Hawai'i seem to occur. Beyond the first year computer science courses, IT students take courses in scripting languages, algorithms, software engineering, data networks, databases, computer security, and human-computer interaction. These courses prepare students to develop and manage computer applications in a broad range of environments including small businesses, large enterprises, IT consulting firms, and local and federal government.

---

The following UHM catalog entry will be added if the Security Science Certificate is approved:

**Security Science (SecSci) Certificate ( BA or BS )**

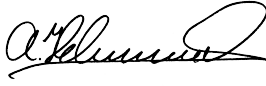
As everyday life increasingly relies on network computation and information, security has become a central problem for ICS. The tasks of protecting security and privacy offer a growing range of employment and business opportunities for ICS graduates— this certificate opens up career paths towards this expanding and exciting area. Although computation begins with programming, modern applications often involve physical and social interactions that cannot be programmed or engineered. The processes of security, privacy, and trust, as studied in SecSci, go beyond the engineering aspects of computation and into computer science as a genuine science.




February 20, 2021

MEMORANDUM

TO: Laura E. Lyons  
Associate Vice Chancellor for Academic Affairs

VIA: Aloysius Helminck,  
Dean, College of Natural Sciences 

FROM: Scott Robertson   
Chair, Department of Information & Computer Sciences

SUBJECT: APPROVAL OF STOP-OUT ON THE INFORMATION TECHNOLOGY (IT)  
TRACK/CONCENTRATION IN THE BA ICS DEGREE

SPECIFIC ACTION REQUESTED:

It is requested that the Associate Vice Chancellor for Academic Affairs approve the stop-out on the Information Technology (IT) track in the Bachelor of Arts in Information and Computer Sciences (BA ICS) degree program.

REQUESTED EFFECTIVE TERM: Fall 2021

ADDITIONAL COST: None

RATIONALE/PURPOSE OF PROPOSED CHANGE(S):


The BA ICS IT track is not a popular track for students in the BA program and IT is no longer a priority in our BA program. For those reasons, we would like to put a stop out on the IT track in the BA ICS degree. We will terminate the track after the three remaining students currently enrolled in the program graduate or are no longer enrolled.

Stop-out of the IT track in the BA ICS degree should be notated in all relevant catalog entries and the program sheets.

ACTION RECOMMENDED:

It is recommended that the Associate Vice Chancellor for Academic Affairs approve the stop-out on the IT track in the BA ICS degree program.

APPROVED/DISAPPROVED:

  
 \_\_\_\_\_  
 Laura E. Lyons  
 Associate Vice Chancellor for Academic Affairs

3/15/21

Date