Demystifying Weighted Semester Credit Hours

Applications and Implications at UTSA

UTSA
The University of Texas at San Antonio™

Presented at TAIR 2025 by Jorge Aviles

Bold discoveries and exciting developments happen at UTSA every day. Here are some resources to help you stay up to date, explore, and better understand the Roadrunner community!

ABOUT UTSA

Overview of the university

UTSA TODAY

Daily news and stories

VISITORS

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Presentation Agenda

- Semester Credit Hours (SCH)
- Weights
- Weighted SCH (WSCH)
- The Texas Public General Academic Institutions Expenditure Study
- Course Inventory
- WSCH Calculation
- UTSA, WSCH, and Incentivized Resource Management
- IR and Business Intelligence Products

Semester Credit Hours (SCH)

- A social construct
  - SCH do not grow on trees
  - Byproduct of our education social institution

- What problem does it solve?
  - Allowed for the measurement of academic progress with increased variance in individual learning paths for students.
    - ✓ Additional Reading:
      - The Credibility of the Credit Hour: The History, Use, and Shortcomings of the Credit System by James Heffernan

https://doi.org/10.1080/00221546.1973.11776844

SCH Operationalized

- At UTSA, a semester credit hour is defined as:
  - The **Carnegie semester unit of credit** for students is equal to a minimum of three hours of work per week for a 15-week semester.
  - **Semester Credit Hour**: Students are awarded credit for classes based on: (a) the number of contact hours in class, and (b) the number of out-of-class hours of student work.
  - Section 2.51, Semester Credit Hour | Handbook of Operating Procedures UTSA

- Others may define differently, but consensus is reached on measuring educational attainment through definitions and policies.

Weight

- What is weight?
  - An analytic tool used to adjust the measurement of a standardized unit to better reflect the context of the measurement. This includes considering factors such as importance, influence, contribution, demand, or effort being measured by the unit.

- Anecdotal Example:
  - Relative Bedtime Weight: Early 1.2, On Time 1.0, Late -0.8
  - Self Measure of Quality Sleep Hours
  - 8 hrs * early 1.2 feels like 9.6 hours
  - 8 hrs * late -.8 feels like 7.4 hours

Generating Weights

- In an analytic capacity, weights can be derived using any method that allows for reflecting the context of a measure.
  - Refer to the literature
  - Use established statistical methods
  - Borrow from other fields or entities

- Identify the most appropriate method for adjusting a standardized unit of measurement to accurately reflect the context we seek to understand.
- **There is no one-size-fits-all solution.**

Weighted Semester Credit Hours (WSCH)

- What are WSCH?
  - The product of semester credit hours and assigned weights.

- How are these weights calculated?
  - It depends.
    - Purpose
    - Context

- What are WSCH role in education administration?
  - Used as an input or output for generating models that guide decisions on the allocation of resources.

Borrowing Weights

- Texas Higher Education Coordinating Board
  - Texas Public General Academic Institutions Expenditure Study

https://www.highered.texas.gov/legislative-appropriations-overviews/expenditure-study/

Relative Weights Matrix

- "The Texas Public General Academic Institutions Expenditure Study draws on the "all funds" expenses reported in the institutions' annual financial reports to produce a relative weight matrix used in calculating the Instruction and Operations (I&O) formula funding."

THECB Texas Public University Expenditure Study - Fiscal Year 2023
Institution Survey for the Year Ended August 31, 2023

Relative Weights (using current methology)

Fund Code	Discipline	UGL	UGU	MAS	DOC	SP	Total
1	Liberal Arts	1.00	1.85	4.36	14.53	-	1.62
2	Science	1.34	2.61	6.04	21.64	-	2.69
3	Fine Arts	1.37	2.63	7.49	10.75	-	2.11
4	Teacher Education	1.22	1.90	2.26	7.52	-	2.41
5	Agriculture	1.41	2.21	9.07	14.21	-	2.83
6	Engineering	1.73	2.77	5.92	18.76	-	3.97
7	Home Economics	0.92	1.78	3.16	14.31	-	1.57
8	Law	-	-	-	-	5.22	5.22
9	Social Service	1.55	1.89	2.50	27.99	-	2.37
10	Library Science	2.64	1.67	3.51	25.57	-	3.93
11	Veterinary Science	-	-	-	-	20.71	20.71
12	Vocational Training	1.45	3.18	-	-	-	1.85
13	Physical Training	3.65	8.36	-	-	-	7.18
14	Health Services	0.97	1.59	2.59	8.12	3.31	1.82
15	Pharmacy	11.28	4.25	41.02	48.77	4.66	7.44
16	Business Administration	1.08	1.87	2.99	38.13	-	2.15
17	Optometry	-	-	-	-	5.19	5.19
18	Teacher Ed-Practice Teaching	1.30	2.28	-	-	-	2.28
19	Technology	1.61	2.26	5.04	8.00	-	2.32
20	Nursing	1.58	2.05	2.71	9.33	-	2.29
	Totals	1.27	2.33	4.16	18.46	6.60	2.32

VetMed calculated with estimated SCH (Headcount X 24).

Overview | Relative Weights | RW History | FTSE Summary | Discipline Summary | Discipline Analysis | UTA | UT | UTD | UTEP | UTRGV

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Breaking Down Relative Weights

Discipline		
Liberal Arts	**Science**	
UG Lower Level	**UG Lower Level**	
$3,228,564,761	$1,753,424,579	All Expenditures
11,391,031	4,623,039	Semester Credit Hours
EXP / SCH =		
$283	$379	Expenditure Per Semester Credit Hour
1.00*	1.34	Relative Weights

Relative expenditure Science UGL SCH to Liberal Arts UGL SCH
$379 divided by $283 equals 1.34

*Base weight

All Expenditures Current 3-Year (FY 2021 - FY 2023)

Fund Code	Discipline	UGL	UGU	
1	Liberal Arts	$ 3,228,564,761	$ 2,501,073,615	$
2	Science	1,753,424,579	1,734,883,226	
3	Fine Arts	599,359,513	485,120,421	
4	Teacher Education	85,430,901	486,146,359	
5	Agriculture	117,825,804	223,569,009	
6	Engineering	776,776,802	1,841,686,263	
7	Home Economics	67,984,835	103,886,718	
8	Law	-	-	
9	Social Service	27,071,400	109,394,568	
10	Library Science	2,655,808	1,365,892	
11	Veterinary Science	-	-	
12	Vocational Training	17,535,579	11,383,606	
13	Physical Training	85,901	583,179	
14	Health Services	135,109,460	377,603,263	
15	Pharmacy	712,917	2,915,102	
16	Business Administration	434,557,211	2,042,388,231	
17	Optometry	-	-	
18	Teacher Ed-Practice Teaching	311,649	75,823,358	
19	Technology	98,707,910	244,281,763	
20	Nursing	38,463,937	542,573,212	
	Totals	$ 7,384,578,970	$ 10,784,677,786	$

Semester Credit Hours 3-Years (FY 2021 - FY 2023)

Fund Code	Discipline	UGL	UGU
1	Liberal Arts	11,391,031	4,760,085
2	Science	4,623,039	2,345,461
3	Fine Arts	1,539,126	650,235
4	Teacher Education	246,924	904,850

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7	Home Economics	0.92	1.78	3.16	14.31	-	1.57
8	Law	-	-	-	-	5.22	5.22
9	Social Service	1.55	1.89	2.50	27.99	-	2.37
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11	Veterinary Science	-	-	-	-	20.71	20.71
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13	Physical Training	3.65	8.36	-	-	-	7.18
14	Health Services	0.97	1.59	2.59	8.12	3.31	1.82
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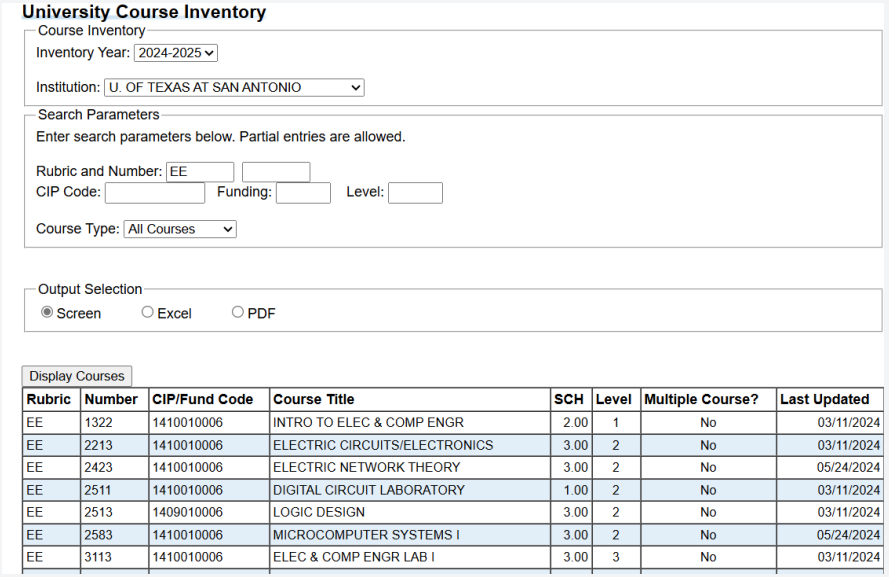
Courses, Discipline, and Levels

- THECB Course Inventory
- The course inventory can serve as a source for determining discipline and level for courses reported to the THECB via CBM003.



University Course Inventory

Course Inventory

Inventory Year: 2024-2025

Institution: U. OF TEXAS AT SAN ANTONIO

Search Parameters

Enter search parameters below. Partial entries are allowed.

Rubric and Number: EE

CIP Code: Funding: Level:

Course Type: All Courses

Output Selection

Screen Excel PDF

Display Courses

Rubric	Number	CIP/Fund Code	Course Title	SCH	Level	Multiple Course?	Last Updated
EE	1322	1410010006	INTRO TO ELEC & COMP ENGR	2.00	1	No	03/11/2024
EE	2213	1410010006	ELECTRIC CIRCUITS/ELECTRONICS	3.00	2	No	03/11/2024
EE	2423	1410010006	ELECTRIC NETWORK THEORY	3.00	2	No	05/24/2024
EE	2511	1410010006	DIGITAL CIRCUIT LABORATORY	1.00	2	No	03/11/2024
EE	2513	1409010006	LOGIC DESIGN	3.00	2	No	03/11/2024
EE	2583	1410010006	MICROCOMPUTER SYSTEMS I	3.00	2	No	05/24/2024
EE	3113	1410010006	ELEC & COMP ENGR LAB I	3.00	3	No	03/11/2024

http://www.txhighereddata.org/interactive/UnivCourse/search.cfm

Courses, Discipline, and Levels

- Relevant Fields Include

Rubric	EE
Number	3213
CIP/Fund Code	**1410010006**
Course Title	ELECTROMAGNETIC ENGINEERING
SCH	3
Level	**3**
Last Updated	3/11/2024

http://www.txhighereddata.org/interactive/UnivCourse/search.cfm

Weights and Courses in Practice

- With relative weights calculated by the THECB, we leverage this data source to calculate a contextualized measure of SCH for courses. Relative expenditures is the context in this case.

- Keeping with THECB methods, we determine the level of SCH generated using the lower of course level or student level per course enrollment.

- CBM0CS Census Student Schedule
  - ✓Course Level Hours Generated Examples
    - Freshman, Sophomore - All levels of enrollment will generate lower-division SCH (Lower-Level)
    - Junior, Senior - Lower division enrollment will generate lower-division SCH; (Upper-Level)all other levels of enrollment will generate upper-division SCH

Enrollment and Student Level

- Determine student enrollment counts by course
  - Potential data sources?
    - Census day records
    - CBM reports
    - A data source that captures enrollment by course at row level by student
  - The key is to build logic to determine SCH generated based on the level of each student and the level of each enrolled course to determine position on the weight matrix.
  - Lower Division, Upper Division, Masters, Doctoral

Student Enrollment and Student Level

- Example logic
  - IF student_level IN (FR,SO)
  - AND course_level IN (3,4) THEN lower_division

  - IF student_level IN (JR,SR)
  - AND course_level IN (3,4) THEN upper_division

  - IF student_level IN (GR,DR)
  - AND course_level = (5) THEN masters

Positioning Course Enrollments on the Matrix

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WSCH Calculation

5 upper division enrollments

*

3 SCH in Electromagnetic Engineering Course

*

2.77 upper-level engineering weight

=

41.55 WSCH

Fund Code	Discipline	UGL	UGU
1	Liberal Arts	1.00	1.85
2	Science	1.34	2.61
3	Fine Arts	1.37	2.63
4	Teacher Education	1.22	1.90
5	Agriculture	1.41	2.21
6	Engineering	1.73	2.77
7	Home Economics	0.92	1.78

WSCH by Course Example

Course				
Rubric	EE			
Number	3213			
Course Title	Electromagnetic Engineering			
Discipline	6			
SCH	3			
Level	3			
Enrollment Level	**Student Enrollment Count**	**SCH**	**Weight**	**WSCH**
UGL	3	9	1.73	15.57
UGU	5	15	2.77	41.55
MAS	1	3	2.77	8.31
DOC	0	0	2.77	0
Total	**9**	**27**		**65.43**

What can we do with WSCH?

- Use them as an input or output to contextualize resources, inform stakeholders of WSCH generation, or enhance data informed decision making.
  - Calculate using institutional data sources
  - On your institution's timeline
  - For your institution's use cases

- UTSA incorporates WSCH in budgeting and planning.
  - Incentivized Resource Management

Incentivized Resource Management

- **The Incentivized Resource Management (IRM) budget model is a customized budgeting approach used by the University of Texas at San Antonio (UTSA) to facilitate resource allocation and better align funding with strategic priorities. The IRM model is designed to provide increased transparency into budgetary decisions that support the university's ability to meet its goals. Published online the Budget Model Overview includes:**

- Background on the university's move to IRM
- IRM unit overview
- Support unit allocation methodology
- Data input drivers
- IRM funds flow
- Model structure for revenue and expense allocations
- Strategic investment fund
- IRM model sample
- Governance structure

https://www.utsa.edu/budget/irm/budget-model-overview-reports/

IRM model assigns WSCH as an allocation driver:

The following highlights the structure of how tuition, course fees and formula funding from state appropriations are allocated to the academic revenue units.

Revenue Source	Allocation Basis
Tuition and Course Fees	
66% to College of Instruction (COI)	WSCH
34% to College of Record	SCH
Differential Tuition	Direct, College of Record
Graduate Incremental Tuition	SCH, College of Record
Course, Lab, and Operation Fees	Direct, College of Record
State Appropriations From Formula	
66% Instruction/Operations Portion	WSCH
34% Instruction/Operations Portion	Total External Restricted Research Expenditures

https://www.utsa.edu/budget/irm/documents/UTSA-IRM-Budget-Model-Overview.pdf

UTSA Institutional Research and Analysis

- Our role in IRM
  - Collaborate on updating and maintaining institutional data sources
  - Develop or maintain business intelligence products to inform stakeholders
  - Deliver annual statement of SCH and WSCH to Office of Budget and Financial Planning
  - Streamline ETL, document processes, and ensure knowledge transfer readiness

UTSA Institutional Research and Analysis

- Power BI Product accessed by select stakeholders

IRM Summary: SCH and WSCH

IRM Year	Su. 2022 - Sp. 2023		Su. 2023 - Sp. 2024		Su. 2024 - Sp. 2025	
College of Record	SCH	%	SCH	%	SCH	%
Business	120,001	14.9%	122,496	14.9%	124,848	14.9%
Education and Human Development	120,100	14.9%	122,400	14.9%	123,759	14.7%
Engineering and Integrated Design	160,200	19.8%	163,200	19.8%	167,464	20.0%
Health, Community and Policy	87,000	10.8%	88,600	10.8%	89,232	10.6%
Liberal and Fine Arts	120,000	14.9%	122,400	14.9%	124,848	14.9%
Sciences	160,000	19.8%	163,200	19.8%	166,464	19.8%
University College	40,000	5.0%	40,800	5.0%	41,616	5.0%
Total	**807,301**	**100.0%**	**823,096**	**100.0%**	**839,320**	**100.0%**

IRM Year	Su. 2022 - Sp. 2023		Su. 2023 - Sp. 2024		Su. 2024 - Sp. 2025	
College of Instruction	WSCH	%	WSCH	%	WSCH	%
Business	272,864	15.0%	275,457	15.0%	281,908	15.1%
Education and Human Development	272,997	15.0%	275,428	15.0%	280,908	15.0%
Engineering and Integrated Design	361,256	19.9%	367,233	20.0%	374,444	20.0%
Health, Community and Policy	182,498	10.0%	183,624	10.0%	185,272	9.9%
Liberal and Fine Arts	275,112	15.1%	275,461	15.0%	281,908	15.1%
Sciences	362,777	19.9%	367,263	20.0%	370,544	19.8%
University College	91,753	5.0%	91,848	5.0%	93,636	5.0%
Total	**1,819,257**	**100.0%**	**1,836,314**	**100.0%**	**1,868,620**	**100.0%**

Included Semesters

IRM Year	Semester
Su. 2022 - Sp. 2023	Summer 2022
Su. 2022 - Sp. 2023	Fall 2022
Su. 2022 - Sp. 2023	Spring 2023
Su. 2023 - Sp. 2024	Summer 2023
Su. 2023 - Sp. 2024	Fall 2023
Su. 2023 - Sp. 2024	Spring 2024
Su. 2024 - Sp. 2025	Summer 2024
Su. 2024 - Sp. 2025	Fall 2024

Wednesday, February 19, 2025

UTSA

Closing Thoughts for IR Colleagues

- We compress complex data into immediate insight that can inform action.
- Document the journey to the snapshot.
- Celebrate the wins.

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