

# BACHELOR OF INFORMATION SYSTEMS ADVANCED/ BACHELOR OF BUSINESS (3745)

**Approved Abbreviation:** BInfSysAdv/BBus  
**Western Sydney University Program Code:** 3745

**CRICOS Code:** 093319G

This program applies to students who commenced in 2022 or later.

Students should follow the program structure for the session start date relevant to the year they commenced.

Commencement Year 2018 - 3745.2 Bachelor of Information Systems Advanced/Bachelor of Business (<http://handbook.westernsydney.edu.au/hbook/course.aspx?course=3745.2>)

Picture yourself at the forefront of the digital revolution, harnessing the power of information technology and innovation to transform the way businesses operate. The Bachelor of Information Systems Advanced/Bachelor of Business double degree will unleash your full potential as you delve into the cutting-edge world of information systems technology and master the art of decision making in the dynamic realm of business.

The Business component provides you with essential knowledge and skills to navigate the corporate landscape confidently and lead with finesse. You'll dive deep into the realms of marketing, finance, management, and entrepreneurship, honing your skills to take on the challenges of today's ever-evolving global economy. You will begin to shape your future in the core business areas of Money, Markets or Management and complete a major in one of eight areas to further develop your business skills and enhance your employability.

Students' knowledge is augmented with an in-depth understanding of advanced information technology concepts and their strategic application in complex business environments. The program's objectives are to cultivate specialised expertise in curriculum areas and emerging technologies such as big data analytics, cloud computing, artificial intelligence, and cybersecurity. Students will develop critical thinking, problem-solving, and research skills, enabling them to address intricate IT challenges and drive innovation.

## Study Mode

Four years full-time or eight years part-time.

## Program Advice

[CDMS@westernsydney.edu.au](mailto:CDMS@westernsydney.edu.au) ([https://directory.westernsydney.edu.au/old/srchprocess\\_handbook.php?a\\_value=CDMS@westernsydney.edu.au](https://directory.westernsydney.edu.au/old/srchprocess_handbook.php?a_value=CDMS@westernsydney.edu.au))

Prospective students should visit the following websites for general enquiries about this program.

Enquire about this program (<https://enquiry.westernsydney.edu.au/courseenquiry/>) | Local Admission (<https://www.westernsydney.edu.au/future/>) | International Admission (<https://www.westernsydney.edu.au/international/home/apply/admissions/>) |

## Location

Campus	Attendance	Mode	Advice
Campbelltown Campus	Full Time	Internal	See above
Campbelltown Campus	Part Time	Internal	See above
Parramatta Campus - Victoria Road	Full Time	Internal	See above
Parramatta Campus - Victoria Road	Part Time	Internal	See above

## Accreditation

The Bachelor of Information Systems Advanced is accredited by the Australian Computing Society at the Professional level.

For the Business component:

- Major T041 Human Resource Management is accredited with the Australian Human Resources Institute (AHRI).
- Major T038 Applied Finance satisfies the educational requirements for membership of the Financial Services Institute of Australasia (Finsia).
- Major T044 - Marketing satisfies the educational requirements for recognition as a Certified Practising Marketer and eligibility for membership of the Australian Marketing Institute (AMI).

## Work Integrated Learning

Western Sydney University seeks to enhance student learning experiences by enabling students to engage in the culture, expectations and practices of their profession or discipline. This program includes a placement or other community-based unpaid practical experience.

There is a mandatory work component required for completion of this program. Please contact the Program Advisor listed above for information.

International students should also refer to the link below for more information and a link to the Commonwealth Register of Institutions and Courses for Overseas Students (CRICOS).

Work Integrated Learning (WIL) for international students ([https://www.westernsydney.edu.au/currentstudents/current\\_students/services\\_and\\_facilities/international\\_student\\_support/working\\_in\\_australia/work\\_integrated\\_learning/](https://www.westernsydney.edu.au/currentstudents/current_students/services_and_facilities/international_student_support/working_in_australia/work_integrated_learning/))

## Admission

### Bachelor of Information Systems Advanced

- Students must have an ATAR 90+.
- Assumed Knowledge: HSC Mathematics and any two units of HSC English

### Bachelor of Business

Eligibility for admission to the Bachelor of Business is based on the following minimum requirements:

- Year 12 HSC (or equivalent); or completed Diploma of Business Western Sydney University The College; or completed relevant VET award.
- Assumed knowledge, Mathematics and any two units of English. Students unable to demonstrate sufficient levels of achievement in mathematics will be required to use the elective subject to increase

their mathematical aptitude. This will not lengthen the period of study.

#### Additional information

Applications from Australian and New Zealand citizens and holders of permanent resident visas may be made via the Universities Admissions Centre (UAC) or directly through the Western Portal. Use the links below to apply via UAC or Western Sydney University. Applications made directly to Western Sydney do not have an application fee.

<http://www.uac.edu.au/>  
<https://westernsydney.uac.edu.au/ws/>

Applicants who have undertaken studies overseas may have to provide proof of proficiency in English. Local applicants who are applying through the Universities Admissions Centre (UAC) will find details of minimum English proficiency requirements and acceptable proof on the UAC website. Local applicants applying directly to the University should also use the information provided on the UAC website.

International students currently completing an Australian Year 12 in or outside Australia, an International Baccalaureate in Australia or a New Zealand National Certificate of Educational Achievement (NCEA) level 3 must apply via UAC International.

<http://www.uac.edu.au/>

All other International applicants must apply directly to the University via the International Office.

International students applying to the University through the International Office can find details of minimum English proficiency requirements and acceptable proof on their website.

International Office (<http://www.westernsydney.edu.au/international/>)

Overseas qualifications must be deemed by the Australian Education International - National Office of Overseas Skills Recognition (AEI-NOOSR) to be equivalent to Australian qualifications in order to be considered by UAC and Western Sydney University.

## Program Structure 2025

Students who complete this award will graduate with a Bachelor of Information Systems Advanced and a Bachelor of Business, with the major from the Bachelor of Business component of the program noted on their testamur.

### Bachelor of Information Systems Advanced Requirements

Students must complete 160 credit points of prescribed Bachelor of Information Systems Advanced subjects.

### Bachelor of Business Requirements

Students must complete 160 credit points of Bachelor of Business (BBus) subjects and are required to select and complete a major.

Students are required to complete

- Core subjects (40 credit points)
- Professional subjects (40 credit points)
- Major subjects (80 credit points from one primary Business major)

#### Core Subjects

Subject	Title	Credit Points
LAWS 1001	Enterprise Law	10
BUSM 1010	Financing Enterprises	10
BUSM 1006	Enterprise Innovation and Markets	10
BUSM 1008	Enterprise Leadership	10
<b>Total Credit Points</b>		<b>40</b>

#### Professional Subjects

The professional subjects provide a focus on careers. Students are required to complete one subject from each of the four key focus areas: numeracy, career planning, innovation, and enterprise engagement, a total of 40 credit points. Students are advised to choose subjects that will support careers in one of four areas:

- Money (for majors in Applied Finance, Economics)
- Markets (for majors in International Business, Marketing and Sport Management)
- Management (for majors in Human Resource Management and Management)
- Business Analytics (for major in Business Analytics)

See the handbook entries for each major for information on the professional subjects that are recommended.

## Bachelor of Business Majors

Students are required to complete eight major core subjects from one of the following primary Business majors.

#### Majors for Careers in Money

Applied Finance, Testamur Major (T038) (<https://hbook.westernsydney.edu.au/majors-minors/applied-finance-ug-testamur-major/>)

Economics, Testamur Major (T039) (<https://hbook.westernsydney.edu.au/majors-minors/economics-ug-testamur-major/>)

#### Majors for Careers in Markets

International Business, Testamur Major (T042) (<https://hbook.westernsydney.edu.au/majors-minors/international-business-ug-testamur-major/>)

Marketing, Testamur Major (T044) (<https://hbook.westernsydney.edu.au/majors-minors/marketing-ug-testamur-major/>)

Sport Management, Testamur Major (T045) (<https://hbook.westernsydney.edu.au/majors-minors/sport-management-ug-testamur-major/>)

#### Majors for Careers in Management

Human Resource Management, Testamur Major (T041) (<https://hbook.westernsydney.edu.au/majors-minors/human-resource-management-ug-testamur-major/>)

Management, Testamur Major (T043) (<https://hbook.westernsydney.edu.au/majors-minors/management-ug-pg-testamur-major/>)

#### Majors for Careers in Business Analytics

Business Analytics, Testamur Major (T130) (<https://hbook.westernsydney.edu.au/majors-minors/business-analytics-ug-testamur-major/>)

## Recommended Sequence 2025

Qualification for this award requires the successful completion of 320 credit points which include the units listed in the recommended sequence below.

Students who complete this award will graduate with a Bachelor of Information Systems Advanced and a Bachelor of Business, with the major from the Bachelor of Business component of the course noted on their testamur.

### Full-time

Use the links on the Structure tab to see the core, professional and major subjects required for each Bachelor of Business major. Students should follow the recommended sequence below and not the sequence listed under each major.

Course	Title	Credit Points
<b>Year 1</b>		
<b>Autumn session</b>		
COMP 1005	Programming Fundamentals	10
INFO 1003	Professional Practice, Communication and Ethics	10
BBus core subject 1		10
BBus core subject 2		10
<b>Credit Points</b>		<b>40</b>
<b>Spring session</b>		
ACCT 1005	Accounting in Context	10
COMP 2005	Computer Networking (Advanced)	10
BBus core subject 3		10
BBus core subject 4		10
<b>Credit Points</b>		<b>40</b>
<b>Year 2</b>		
<b>Autumn session</b>		
BUSM 1042	Introduction to Business Analytics	10
INFS 2014	Systems Analysis and Design (Advanced)	10
BBus major subject 1		10
BBus Professional subject 1		10
<b>Credit Points</b>		<b>40</b>
<b>Spring session</b>		
INFS 2002	Database Design and Development (Advanced)	10
INFS 1016	Digital Transformation	10
BBus major subject 2		10
BBus professional subject 2		10
<b>Credit Points</b>		<b>40</b>
<b>Year 3</b>		
<b>Autumn session</b>		
INFS 2012	Digital Technologies and Security	10
INFO 3004	Human-Computer Interaction (Advanced)	10
BBus major subject 3		10
BBus major subject 4		10
<b>Credit Points</b>		<b>40</b>
<b>Spring session</b>		
INFS 3024	Enterprise Architecture and Design Thinking	10
INFO 3019	Project Management	10
BBus major subject 5		10

BBus major subject 6		10
<b>Credit Points</b>		<b>40</b>
<b>Year 4</b>		
<b>Autumn session</b>		
INFS 3023	Advanced Systems Development Methodologies	10
INFS 3007	Emerging Trends in Information Systems (Advanced)	10
BBus major subject 7		10
BBus professional subject 3		10
<b>Credit Points</b>		<b>40</b>
<b>Spring session</b>		
COMP 3019	Professional Experience (Advanced)	10
INFS 3027	Social Computing and Systems Thinking	10
BBus major subject 8		10
BBus professional subject 4		10
<b>Credit Points</b>		<b>40</b>
<b>Total Credit Points</b>		<b>320</b>

### Part-time

Use the links on the Structure tab to see the core, professional and major subjects required for each Bachelor of Business major. Students should follow the recommended sequence below and not the sequence listed under each major.

Course	Title	Credit Points
<b>Year 1</b>		
<b>Autumn session</b>		
COMP 1005	Programming Fundamentals	10
BBus core subject 1		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 1016	Digital Transformation	10
BBus core subject 2		10
<b>Credit Points</b>		<b>20</b>
<b>Year 2</b>		
<b>Autumn session</b>		
ACCT 1005	Accounting in Context	10
BBus core subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 2002	Database Design and Development (Advanced)	10
BBus core subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Year 3</b>		
<b>Autumn session</b>		
INFO 1003	Professional Practice, Communication and Ethics	10
BBus professional subject 1		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
COMP 2005	Computer Networking (Advanced)	10
BBus major subject 1		10
<b>Credit Points</b>		<b>20</b>

<b>Year 4</b>		
<b>Autumn session</b>		
INFS 2014	Systems Analysis and Design (Advanced)	10
BBus professional subject 2		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
BUSM 1042	Introduction to Business Analytics	10
BBus major subject 2		10
<b>Credit Points</b>		<b>20</b>
<b>Year 5</b>		
<b>Autumn session</b>		
INFS 2012	Digital Technologies and Security	10
BBus major subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFO 3019	Project Management	10
BBus major subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Year 6</b>		
<b>Autumn session</b>		
INFO 3004	Human-Computer Interaction (Advanced)	10
BBus major subject 5		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 3023	Advanced Systems Development Methodologies	10
BBus major subject 6		10
<b>Credit Points</b>		<b>20</b>
<b>Year 7</b>		
<b>Autumn session</b>		
INFS 3007	Emerging Trends in Information Systems (Advanced)	10
BBus major subject 7		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 3024	Enterprise Architecture and Design Thinking	10
BBus professional subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Year 8</b>		
<b>Autumn session</b>		
COMP 3019	Professional Experience (Advanced)	10
BBus major subject 8		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 3027	Social Computing and Systems Thinking	10
BBus professional subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Total Credit Points</b>		<b>320</b>

## Program Structure 2022 - 2024

Students who complete this award will graduate with a Bachelor of Information Systems Advanced and a Bachelor of Business, with the major from the Bachelor of Business component of the program noted on their testamur.

## Bachelor of Information Systems Advanced Requirements

Students must complete 160 credit points of prescribed Bachelor of Information Systems Advanced subjects.

## Bachelor of Business Requirements

Students must complete 160 credit points of Bachelor of Business (BBus) subjects and are required to select and complete a major.

Students are required to complete

- Core subjects (40 credit points)
- Professional subjects (40 credit points)
- Major subjects (80 credit points from one primary Business major)

### Core Subjects

Subject	Title	Credit Points
LAWS 1001	Enterprise Law	10
BUSM 1010	Financing Enterprises	10
BUSM 1006	Enterprise Innovation and Markets	10
BUSM 1008	Enterprise Leadership	10
<b>Total Credit Points</b>		<b>40</b>

### Professional Subjects

The professional subjects provide a focus on careers. Students are required to complete one subject from each of the four key focus areas: numeracy, career planning, innovation, and enterprise engagement, a total of 40 credit points. Students are advised to choose subjects that will support careers in one of three areas:

- Money (for majors in Accounting, Applied Finance, Business Analytics, Economics and Property)
- Markets (for majors in International Business, Marketing and Sport Management)
- Management (for majors in Human Resource Management and Management)

See the handbook entries for each major for information on the professional subjects that are recommended.

## Bachelor of Business Majors

Students are required to complete eight major core subjects from one of the following primary Business majors.

### Majors for Careers in Money

Applied Finance, Testamur Major (T038) (<https://hbook.westernsydney.edu.au/majors-minors/applied-finance-ug-testamur-major/>)

Economics, Testamur Major (T039) (<https://hbook.westernsydney.edu.au/majors-minors/economics-ug-testamur-major/>)

Business Analytics, Testamur Major (<https://hbook.westernsydney.edu.au/majors-minors/business-analytics-ug-testamur-major/>)

### Majors for Careers in Markets

International Business, Testamur Major (T042) (<https://hbook.westernsydney.edu.au/majors-minors/international-business-ug-testamur-major/>)

Marketing, Testamur Major (T044) (<https://hbook.westernsydney.edu.au/majors-minors/marketing-ug-testamur-major/>)

Sport Management, Testamur Major (T045) (<https://hbook.westernsydney.edu.au/majors-minors/sport-management-ug-testamur-major/>)

### Majors for Careers in Management

Human Resource Management, Testamur Major (T041) (<https://hbook.westernsydney.edu.au/majors-minors/human-resource-management-ug-testamur-major/>)

Management, Testamur Major (T043) (<https://hbook.westernsydney.edu.au/majors-minors/management-ug-pg-testamur-major/>)

### Replaced Majors

The majors listed below count towards completion of this program for students who began studying these majors prior to the years indicated below.

MT2035 Hospitality Management, Testamur Major (<http://handbook.westernsydney.edu.au/hbook/specialisation.aspx?unitset=MT2035.1>), discontinued in 2020.

MT2027 Marketing, Testamur Major (<http://handbook.westernsydney.edu.au/hbook/specialisation.aspx?unitset=M1054.1>), replaced by Marketing, Testamur Major in 2021 (listed above).

## Recommended Sequence 2022 - 2024

Qualification for this award requires the successful completion of 320 credit points which include the units listed in the recommended sequence below.

Students who complete this award will graduate with a Bachelor of Information Systems Advanced and a Bachelor of Business, with the major from the Bachelor of Business component of the course noted on their testamur.

### Full-time

Use the links on the Structure tab to see the core, professional and major subjects required for each Bachelor of Business major. Students should follow the recommended sequence below and not the sequence listed under each major.

Course	Title	Credit Points
<b>Year 1</b>		
<b>Autumn session</b>		
COMP 1005	Programming Fundamentals	10
COMM 1026	Principles of Professional Communication 1	
Note: From Autumn 2024 COMM 1026 is replaced by COMM 1044		10
COMM 1044	Professional Communication	
BBus core subject 1		10
BBus core subject 2		10
<b>Credit Points</b>		<b>40</b>
<b>Spring session</b>		
MATH 1030	Statistics for Business	10
Note: MATH 1030 is also the BBus Professional subject 1		
COMP 2005	Computer Networking (Advanced)	10
BBus core subject 3		10

BBus core subject 4		10
<b>Credit Points</b>		<b>40</b>

### Year 2

#### Autumn session

INFS 1015	Systems Analysis and Design (Advanced)	
From Autumn 2025, Students are advised to select INFS 2014 Systems Analysis and Design (Advanced). Please contact the subject coordinator regarding the prerequisite requirements.		
INFS 2014	Systems Analysis and Design (Advanced)	10
INFS 1002	Information Systems in Context	10
BBus major subject 1		10
Select one elective subject		10
<b>Credit Points</b>		<b>40</b>

#### Spring session

INFS 2002	Database Design and Development (Advanced)	10
INFO 3001	Computer Security	10
From Autumn 2024 INFO 3001 is replaced by COMP 2027		
COMP 2027	Cyber Security	10
BBus major subject 2		10
BBus professional subject 2		10
<b>Credit Points</b>		<b>50</b>

### Year 3

#### Autumn session

COMP 2020	Technologies for Web Applications	10
INFO 3004	Human-Computer Interaction (Advanced)	10
BBus major subject 3		10
BBus major subject 4		10
<b>Credit Points</b>		<b>40</b>

#### Spring session

INFS 3012	Information Systems Deployment and Management	10
COMP 3013	Mobile Applications Development	10
BBus major subject 5		10
BBus major subject 6		10
<b>Credit Points</b>		<b>40</b>

### Year 4

#### Autumn session

INFO 3008	Professional Development	10
From Spring 2024 INFO 3008 replaced by INFO 3019		
INFO 3019	Project Management	10
INFS 3007	Emerging Trends in Information Systems (Advanced)	10
BBus major subject 7		10
BBus professional subject 3		10
<b>Credit Points</b>		<b>50</b>

#### Spring session

COMP 3019	Professional Experience (Advanced)	10
INFO 3011	Social Computing	10
BBus major subject 8		10
BBus professional subject 4		10
<b>Credit Points</b>		<b>40</b>
<b>Total Credit Points</b>		<b>340</b>

### Equivalent Subjects

The subjects listed below count towards completion of this program for students who passed these subjects in 2023 or earlier.

INFO 3008 Professional Development replaced by INFO 3019 Project Management

### Replaced Subjects

The subjects listed below count towards completion of this program for students who passed these subjects in 2023 or earlier.

INFO 3001 Computer Security

COMM 1026 Principles of Professional Communication 1

The subjects listed below count towards completion of this program for students who passed these subjects in 2024 or earlier.

INFS 1015 Systems Analysis and Design (Advanced)

### Part-time

Use the links on the Structure tab to see the core, professional and major subjects required for each Bachelor of Business major. Students should follow the recommended sequence below and not the sequence listed under each major.

Course	Title	Credit Points
<b>Year 1</b>		
<b>Autumn session</b>		
COMP 1005	Programming Fundamentals	10
BBus core subject 1		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 1002	Information Systems in Context	10
BBus core subject 2		10
<b>Credit Points</b>		<b>20</b>
<b>Year 2</b>		
<b>Autumn session</b>		
COMM 1026	Principles of Professional Communication 1	10
Note: From Autumn 2024 COMM 1026 is replaced by COMM 1044		10
COMM 1044	Professional Communication	10
BBus core subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 2002	Database Design and Development (Advanced)	10
BBus core subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Year 3</b>		
<b>Autumn session</b>		
MATH 1030	Statistics for Business	10
Note: MATH 1030 is also the BBus Professional subject 1		
Select one elective subject		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
COMP 2005	Computer Networking (Advanced)	10
BBus major subject 1		10
<b>Credit Points</b>		<b>20</b>
<b>Year 4</b>		
<b>Autumn session</b>		
INFS 1015	Systems Analysis and Design (Advanced)	10

From Autumn 2025, Students are advised to select INFS 2014 Systems Analysis and Design (Advanced). Please contact the subject coordinator regarding the prerequisite requirements.

INFS 2014	Systems Analysis and Design (Advanced)	10
BBus professional subject 2		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFO 3001	Computer Security	10
From Autumn 2024 INFO 3001 is replaced by COMP 2027		
COMP 2027	Cyber Security	10
BBus major subject 2		10
<b>Credit Points</b>		<b>30</b>
<b>Year 5</b>		
<b>Autumn session</b>		
INFO 3004	Human-Computer Interaction (Advanced)	10
BBus major subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFS 3012	Information Systems Deployment and Management	10
BBus major subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Year 6</b>		
<b>Autumn session</b>		
COMP 2020	Technologies for Web Applications	10
BBus major subject 5		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
COMP 3013	Mobile Applications Development	10
BBus major subject 6		10
<b>Credit Points</b>		<b>20</b>
<b>Year 7</b>		
<b>Autumn session</b>		
INFS 3007	Emerging Trends in Information Systems (Advanced)	10
BBus major subject 7		10
<b>Credit Points</b>		<b>20</b>
<b>Spring session</b>		
INFO 3011	Social Computing	10
BBus professional subject 3		10
<b>Credit Points</b>		<b>20</b>
<b>Year 8</b>		
<b>Autumn session</b>		
INFO 3008	Professional Development	10
From Spring 2024 INFO 3008 replaced by INFO 3019		
INFO 3019	Project Management	10
BBus major subject 8		10
<b>Credit Points</b>		<b>30</b>
<b>Spring session</b>		
COMP 3019	Professional Experience (Advanced)	10
BBus professional subject 4		10
<b>Credit Points</b>		<b>20</b>
<b>Total Credit Points</b>		<b>340</b>

**Equivalent Subjects**

The subjects listed below count towards completion of this program for students who passed these subjects in 2023 or earlier.

INFO 3008 Professional Development replaced by INFO 3019 Project Management

**Replaced Subjects**

The subjects listed below count towards completion of this program for students who passed these subjects in 2023 or earlier.

INFO 3001 Computer Security

COMM 1026 Principles of Professional Communication 1

The subjects listed below count towards completion of this program for students who passed these subjects in 2024 or earlier.

INFS 1015 Systems Analysis and Design (Advanced)