# MANAGEMENT INFORMATION SYSTEMS, OPERATIONS & SUPPLY CHAIN MANAGEMENT, AND BUSINESS ANALYTICS

Majors:

- Bachelor of Science in Business Administration, Business Analytics (p. 1)
- Bachelor of Science in Business Administration, Management Information Systems (p. 2)
- Bachelor of Science in Business Administration, Operations and Supply Chain Management (p. 5)

Minors:

- Business Analytics (p. 8)
- Business Intelligence (p. 4)
- Cyber-Security (p. 4)
- Management Information Systems (p. 5)
- Operations and Supply Chain Management (p. 7)

The Department of Management Information Systems, Operations & Supply Chain Management, and Business Analytics offers courses in several quantitative, systems, and process related areas; a major and a minor in business analytics, a major and a minor in management information systems, a major and minor in operations and chain supply management, and minors in business intelligence and cyber-security.

## Business Analytics

Business Analytics entails using specialized software and programming languages to build statistical and optimization models that can be used to guide managerial decision making. The analytical tools that are learned drive understanding of business problems and provide insights into opportunities and changes in the business environment. Business Analytics helps to identify the important factors managers can manipulate to deliver increased revenue, profit, quality, market share, and decreased carbon use and waste.

### Faculty

Mark Jacobs, Chairperson
Professor Emeritus and Distinguished Service Professor: Bohlen, Dunne
Professors Emeriti: Amsden, Ferratt, Hoffer, Kanet, Wells
Sherman-Standard Register Professor of Cyber-security Management: Salisbury
Sherman-Standard Register Associate Professor of MIS: Wynn
Niehaus Chair in Business Analytics and Operations Management: Gorman
Professors: Enns, Gorman, Jacobs, Prasad, Salisbury
Associate Professors: Wynn
Assistant Professors: Hazen, Kim, Khorasani, Lee, Nittala, Park, Raman, Zolbanin
Assistant Clinical Professor: Hvalshagen

Lecturers: Edelmann, Hall, Prince, Serve, Wagner

## Bachelor of Science in Business Administration, Business Analytics (BAN) minimum 125 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

| **Common Academic Program (CAP)** [1] | | |
|---|---|---|
| First-Year Humanities Commons [2] | | 12 cr. hrs. |
| | HST 103 | Introduction to Global Historical Studies |
| | REL 103 | Introduction to Religious and Theological Studies |
| | PHL 103 | Introduction to Philosophy |
| | ENG 100 | Writing Seminar I [3] |
| Second-Year Writing Seminar [4] | | 0-3 cr. hrs. |
| | ENG 200 | Writing Seminar II |
| Oral Communication | | 3 cr. hrs. |
| | CMM 100 | Principles of Oral Communication |
| Mathematics | | 3 cr. hrs. |
| Social Science | | 3 cr. hrs. |
| | SSC 200 | Social Science Integrated |
| Arts | | 3 cr. hrs. |
| Natural Sciences [5] | | 7 cr. hrs. |
| Crossing Boundaries | | up to 12 cr. hrs. |
| | Faith Traditions | |
| | Practical Ethical Action | |
| | Inquiry [6] | |
| | Integrative | |
| Advanced Study | | |
| | Philosophy and/or Religious Studies (6 cr. hrs.) | |
| | Historical Studies (3 cr. hrs.) [7] | |

| Diversity and Social Justice [8] | 3 cr. hrs. |
|---|---|
| Major Capstone [9] | 0-6 cr. hrs. |

[1] The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.

[2] May be completed with ASI 110 and ASI 120 through the Core Program.

[3] May be completed with ENG 100A and ENG 100B, by placement.

[4] May be completed with ENG 114 or ENG 198 or ASI 120.

[5] Must include two different disciplines and at least one accompanying lab.

[6] U.S. History AP and CLEP credit will not satisfy this requirement.

[7] May be completed with ASI 110 and ASI 120 through the Core Program. U.S. History AP and CLEP credit will not satisfy this requirement.

[8] May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.

[9] The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

**SBA Core Curriculum** [1]

| ACC 207 | Introduction to Financial Accounting | 3 |
|---|---|---|
| ACC 208 | Introduction to Managerial Accounting | 3 |
| BIZ 101 | Business Education Planning [2] | 1 |
| BIZ 103 | Develop Your Vocation and Career Flight Plan [3] | 1 |
| BIZ 201 | Introduction to Business | 3 |
| BIZ 202 | Career Flight Takeoff [4] | 1 |
| BIZ 301 | Successfully Navigating Your Career Flight Plan | 1 |
| DSC 210 | Statistics for Business I [5] | 3 |
| or BAN 210 | Statistics for Business I | |
| DSC 211 | Statistics for Business II [5] | 3 |
| or BAN 211 | Statistics for Business II | |
| ECO 203 | Principles of Microeconomics | 3 |
| ECO 204 | Principles of Macroeconomics | 3 |
| ENG 370 | Report & Proposal Writing | 3 |
| or ENG 371 | Technical Communication | |
| or ENG 372 | Business and Professional Writing | |
| FIN 301 | Introduction to Financial Management | 3 |
| MGT 201 | Legal Environment of Business | 3 |
| MGT 301 | Organizational Behavior | 3 |
| MGT 490 | Managing the Enterprise | 3 |
| MTH 128 | Finite Mathematics | 3 |
| MTH 129 | Calculus for Business | 3 |
| MIS 301 | Information Systems in Organizations | 3 |
| MKT 301 | Principles of Marketing | 3 |
| OPS 301 | Survey of Operations & Supply Management | 3 |
| REL 368 | Christian Ethics & the Business World | 3 |

| or PHL 313 | Business Ethics | |
|---|---|---|
| ECO elective (300/400 level) | | 3 |
| BWISE requirement | | 0 |

[1] No more than two semester grades of D are allowed in the SBA Core Curriculum. When this threshold is violated, the course grade will not satisfy the SBA Core Curriculum requirement. A course may be taken again in order to demonstrate a grade above a D. The University policy regarding calculating GPA when a course is re-taken applies in these circumstances.

[2] Requirement is waived for students who transfer from other universities.

[3] Requirement is waived for students who transfer from other universities with more than 45 credit hours.

[4] Requirement is *optional* for students who transfer from other universities with more than 45 credit hours.

[5] Course offerings will transition from DSC to BAN no earlier than Fall 2024.

**Major Requirements**

| BAN 312 - Statistics for Business Analytics | 3 |
|---|---|
| BAN 302 - Intro to Programming for Business Analytics | 3 |
| MIS 305 - Intro to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 385 - Database Design & Implementation | 3 |
| BAN 402 - Prescriptive Analytics | 3 |
| BAN Elective | 3 |
| MIS 366 - Business Intelligence | 3 |
| BAN 482 - Foundations of Machine Learning | 3 |
| BAN 495 - Business Analytics Capstone | 3 |
| **Total Hours** | **25** |

Academic elective to bring total to at least 125 credits

# Management Information Systems

The MIS major at the University of Dayton is designed primarily to develop business systems analysts. These professionals analyze and design information systems in business organizations and marshal resources (i.e. manage projects) to bring the systems development effort to successful completion. MIS professionals also facilitate the successful operation and maintenance of organizational information systems.

The major is comprised of eighteen hours of required courses which make up the MIS core and six hours of elective courses taken for breadth.  Optionally, this breadth requirement can be satisfied by completing a related minor - currently Business Intelligence or Cyber Security - or by completing a double major in another business discipline.   Related minors will change from time to time, reflecting the dynamic nature of the MIS discipline. Students should meet with their advisor to decide whether to opt for elective courses, a related minor, or a double-major consistent with their interests and career goals.

### Faculty
Mark Jacobs, Chairperson
Professor Emeritus and Distinguished Service Professor: Bohlen, Dunne
Professors Emeriti: Amsden, Ferratt, Hoffer, Kanet, Wells
Sherman-Standard Register Professor of Cyber-security Management: Salisbury

Sherman-Standard Register Associate Professor of MIS: Wynn
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Professors: Enns, Gorman, Jacobs, Prasad, Salisbury
Associate Professors: Wynn
Assistant Professors: Ambulkar, Lee, Nittala, Raman, Sullivan, Zolbanin
Assistant Clinical Professor: Hvalshagen
Lecturers: Edelmann, Hall, Prince, Wagner

# Bachelor of Science in Business Administration, Management Information Systems (MIS) minimum 125 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

## Common Academic Program (CAP) [1]

| First-Year Humanities Commons [2] | | 12 cr. hrs. |
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| HST 103 | Introduction to Global Historical Studies | |
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| PHL 103 | Introduction to Philosophy | |
| ENG 100 | Writing Seminar I [3] | |
| Second-Year Writing Seminar [4] | | 0-3 cr. hrs. |
| ENG 200 | Writing Seminar II | |
| Oral Communication | | 3 cr. hrs. |
| CMM 100 | Principles of Oral Communication | |
| Mathematics | | 3 cr. hrs. |
| Social Science | | 3 cr. hrs. |
| SSC 200 | Social Science Integrated | |
| Arts | | 3 cr. hrs. |
| Natural Sciences [5] | | 7 cr. hrs. |
| Crossing Boundaries | | up to 12 cr. hrs. |
| Faith Traditions | | |
| Practical Ethical Action | | |
| Inquiry [6] | | |
| Integrative | | |
| Advanced Study | | |
| Philosophy and/or Religious Studies (6 cr. hrs.) | | |
| Historical Studies (3 cr. hrs.) [7] | | |
| Diversity and Social Justice [8] | | 3 cr. hrs. |
| Major Capstone [9] | | 0-6 cr. hrs. |

[1] The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.

[2] May be completed with ASI 110 and ASI 120 through the Core Program.

[3] May be completed with ENG 100A and ENG 100B, by placement.

[4] May be completed with ENG 114 or ENG 198 or ASI 120.

[5] Must include two different disciplines and at least one accompanying lab.

[6] U.S. History AP and CLEP credit will not satisfy this requirement.

[7] May be completed with ASI 110 and ASI 120 through the Core Program. U.S. History AP and CLEP credit will not satisfy this requirement.

[8] May not double count with First-Year Humanities Commons, Second-Year Writing, Oral Communication, Social Science, Arts, or Natural Sciences CAP components, but may double count with courses taken to satisfy other CAP components and/or courses taken in the student's major.

[9] The course or experience is designed by faculty in each major; it may, or may not, be assigned credit hours.

## SBA Core Curriculum [1]

| ACC 207 | Introduction to Financial Accounting | 3 |
|---|---|---|
| ACC 208 | Introduction to Managerial Accounting | 3 |
| BIZ 101 | Business Education Planning [2] | 1 |
| BIZ 103 | Develop Your Vocation and Career Flight Plan [3] | 1 |
| BIZ 201 | Introduction to Business | 3 |
| BIZ 202 | Career Flight Takeoff [4] | 1 |
| BIZ 301 | Successfully Navigating Your Career Flight Plan | 1 |
| DSC 210 | Statistics for Business I [5] | 3 |
| or BAN 210 | Statistics for Business I | |
| DSC 211 | Statistics for Business II [5] | 3 |
| or BAN 211 | Statistics for Business II | |
| ECO 203 | Principles of Microeconomics | 3 |
| ECO 204 | Principles of Macroeconomics | 3 |
| ENG 370 | Report & Proposal Writing | 3 |
| or ENG 371 | Technical Communication | |
| or ENG 372 | Business and Professional Writing | |
| FIN 301 | Introduction to Financial Management | 3 |
| MGT 201 | Legal Environment of Business | 3 |
| MGT 301 | Organizational Behavior | 3 |
| MGT 490 | Managing the Enterprise | 3 |
| MTH 128 | Finite Mathematics | 3 |

| MTH 129 | Calculus for Business | 3 |
|---|---|---|
| MIS 301 | Information Systems in Organizations | 3 |
| MKT 301 | Principles of Marketing | 3 |
| OPS 301 | Survey of Operations & Supply Management | 3 |
| REL 368 | Christian Ethics & the Business World | 3 |
| or PHL 313 | Business Ethics | |
| ECO elective (300/400 level) | | 3 |
| BWISE requirement | | 0 |

[1]  No more than two semester grades of D are allowed in the SBA Core Curriculum. When this threshold is violated, the course grade will not satisfy the SBA Core Curriculum requirement. A course may be taken again in order to demonstrate a grade above a D. The University policy regarding calculating GPA when a course is re-taken applies in these circumstances.

[2]  Requirement is waived for students who transfer from other universities.

[3]  Requirement is waived for students who transfer from other universities with more than 45 credit hours.

[4]  Requirement is *optional* for students who transfer from other universities with more than 45 credit hours.

[5]  Course offerings will transition from DSC to BAN no earlier than Fall 2024.

**Major Requirements**

| MIS 150 | Professional Development Experiences in Information Systems | 0 |
|---|---|---|
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 325 | Programming for Business Systems | 4 |
| MIS 380 | Systems Analysis & Re-Engineering | 3 |
| MIS 381 | Principles of Project Management | 1 |
| MIS 385 | Systems Implementation with Database Management Systems | 3 |
| MIS 465 | MIS Project I-Analysis & Design in Teams | 3 |
| MIS 475 | MIS Project II-Design & Implementation in Teams (Satisfies CAP Major Capstone.) | 3 |
| Breadth courses through electives, related minors, or double majors. | | 6 |
| **Total Hours** | | **24** |

**Electives Option**

| Select two courses from: | | 6 |
|---|---|---|
| MIS 366 | Business Intelligence | |
| MIS 368 | Principles of Information Security Management | |
| MIS 430 | Telecommunications & Networking | |
| MIS 460 | Advanced Web Development | |
| MIS 467 | Data Warehousing | |
| MIS 468 | Internet Security | |
| MIS 499 | Independent Study in Management Information Systems | |

**Related Minor Option**

Complete requirements for one of these two minors: (1) Business Intelligence or (2) Cyber Security

**Double Major Option**

Complete the requirements for any other SBA major.

Academic electives to bring total to at least 125 credits

# Minor in Business Intelligence (BIN)

### Minor in Business Intelligence

| Business Majors | | |
|---|---|---|
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 366 | Business Intelligence | 3 |
| MIS 385 | Systems Implementation with Database Management Systems | 3 |
| MIS 467 | Data Warehousing | 3 |
| MIS elective [1,2] | | 3 |
| **Total Hours** | | **13** |

[1]  Choose from DSC 375, ECO 410, ECO 441, MIS 368, MIS 460, MKT 436 or as approved by the coordinator. MIS majors must select six semester hours from this list instead of three.

[2]  MIS 365 may not be used as an elective for any minor in the MOA Department.

| Non-Business Majors | | |
|---|---|---|
| MIS 300 | Survey of Management Information Systems | 3 |
| or MIS 301 | Information Systems in Organizations | |
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 366 | Business Intelligence | 3 |
| MIS 385 | Systems Implementation with Database Management Systems | 3 |
| MIS 467 | Data Warehousing | 3 |
| MIS elective [1] | | 3 |
| **Total Hours** | | **16** |

[1]  Choose from DSC 375, ECO 410, ECO 441, MIS 368, MIS 460, MKT 436 or as approved by the coordinator.

# Minor in Cyber-Security (CSM)

### Minor in Cyber-Security

| Business Majors | | |
|---|---|---|
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 368 | Principles of Information Security Management | 3 |
| MIS 430 | Telecommunications & Networking | 3 |
| MIS 468 | Internet Security | 3 |
| 300/400 MIS elective [1] | | 3 |
| **Total Hours** | | **13** |

| Non-Business Majors | | |
|---|---|---|
| MIS 300 | Survey of Management Information Systems | 3 |
| or MIS 301 | Information Systems in Organizations | |
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 368 | Principles of Information Security Management | 3 |
| MIS 430 | Telecommunications & Networking | 3 |

| MIS 468 | Internet Security | 3 |
|---|---|---|
| 300/400 MIS elective [1] | | 3 |
| **Total Hours** | | **16** |

[1]  Any 300/400 MIS course except MIS 491 (http://catalog.udayton.edu/search/?P=MIS%20491), MIS 492 (http://catalog.udayton.edu/search/?P=MIS%20492), MIS 497 (http://catalog.udayton.edu/search/?P=MIS%20497), MIS 498 (http://catalog.udayton.edu/search/?P=MIS%20498), MIS 499 (http://catalog.udayton.edu/search/?P=MIS%20499) or as approved by the coordinator. MIS majors must select from courses that are not required for the major.

## Minor in Management Information Systems (MIS)

**Minor in Management Information Systems**

| Business Majors | | |
|---|---|---|
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 380 | Systems Analysis & Re-Engineering | 3 |
| MIS 381 | Principles of Project Management | 1 |
| MIS 385 | Systems Implementation with Database Management Systems | 3 |
| Two 300/400 level courses [1] | | 6 |
| **Total Hours** | | **14** |

[1]  Select six additional semester hours: at least three hours must be a 300 or 400 level MIS course (excluding MIS 491, MIS 492 , MIS 497, MIS 498, and MIS 499); three additional hours may be either from the list of approved relevant major courses or another 300 or 400 level MIS course (excluding those listed above). A relevant major course is one that features concepts intended to bridge between the MIS minor and the student's major. For the list of approved relevant major courses see the MIS minor coordinator. Other courses may be taken with approval of the MIS minor coordinator, in consultation with the student's major advisor(s). Currently approved relevant major courses are: ACC 401, DSC 375, ECO 410,ECO 441, MKT 436, and OPS 350.

**Non-Business Majors**

| MIS 300 | Survey of Management Information Systems | 3 |
|---|---|---|
| or MIS 301 | Information Systems in Organizations | |
| MIS 305 | Introduction to Business Applications: Problem Solving with Visual Tools | 1 |
| MIS 380 | Systems Analysis & Re-Engineering | 3 |
| MIS 381 | Principles of Project Management | 1 |
| MIS 385 | Systems Implementation with Database Management Systems | 3 |
| Two 300/400 level courses [1] | | 6 |
| **Total Hours** | | **17** |

[1]  Select six additional semester hours: at least three hours must be a 300 or 400 level MIS course (excluding MIS 491, MIS 492 , MIS 497, MIS 498, and MIS 499); three additional hours may be either from the list of approved relevant major courses or another 300 or 400 level MIS course (excluding those listed above). A relevant major course is one that features concepts intended to bridge between the MIS minor and the student's major. For the list of approved relevant major courses see

the MIS minor coordinator. Other courses may be taken with approval of the MIS minor coordinator, in consultation with the student's major advisor(s). Currently approved relevant major courses are: ACC 401, DSC 375, ECO 410,ECO 441, MKT 436, and OPS 350.

## Operations & Supply Chain Management

The operations and supply chain management program offered by the Department of Management Information Systems, Operations & Supply Chain Management, and Business Analytics includes a major and a minor in operations and supply chain management (OSC).

Students who major or minor in operations and supply chain management learn how to manage the core operations of an organization. These core operations use the human, technical, and financial resources of the organization to create goods and services for customers. Operations managers apply technical and quantitative tools and techniques, together with behavioral skills, to manage the transformation of inputs into outputs desired by customers. Operations managers participate in these transformation processes in many different roles, including:

- Process improvement analyst
- Quality assurance analyst
- Purchasing manager
- Supply Chain Manager
- Production manager
- Warehouse / materials manager
- Service facility manager
- Operations consultant

The OSC program is selective and requires a student application process for UD internal transfer students (students transferring to the School of Business from another UD academic unit) and current School of Business students. UD students wishing to declare an OSC major must have an overall GPA of 2.8 or higher. Moreover, to declare and/or remain in the program students must earn a grade of B- or higher in the introductory course (OPS 301) and in BAN 211. Exceptions to these requirements must be approved by the Department Chair.

In addition to other requirements, the major in Operations and Supply Chain Management requires OPS 350, Business Process Management; BAN 375, Management Science; OPS 401, Operations Planning and Control; OPS 480, Supply Chain Management Strategies; OPS 485, Capstone OPS Project I; OPS 495, Capstone OPS Project II; and six semester hours of OPS electives (at least 3 hours of electives in either OSC-or-BA-designated courses, or permission of Department Chair).

Students who major in OSC are encouraged to consider the many OSC co-op and internship opportunities through association with UD's Career Services.  Although not a requirement, most students do combine such experiences with their program of study in OSC.  Experience shows that co-oping or interning in an OSC-related assignment affords students a richer appreciation of the applicability of their coursework and adds to the already strong position OSC grads enjoy in the job market.  Normally the co-op experience requires an additional year to complete the degree, but because of the flexibility in course requirements, with advanced planning it is quite possible to complete a co-op and graduate in OSC within four years.

A minor in operations and supply chain management is available to students who want to acquire basic skills in this area and understand that doing so will enhance their ability to manage operations in any functional area of a business. A minor in operations and supply chain management consists of twelve hours for students in the School of Business Administration and 21 hours for non-business students.

**Faculty**

Mark Jacobs, Chairperson
Professor Emeritus and Distinguished Service Professor: Bohlen, Dunne
Professors Emeriti: Amsden, Ferratt, Hoffer, Kanet, Wells
Sherman-Standard Register Professor of Cyber-security Management: Salisbury
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Assistant Clinical Professor: Hvalshagen
Lecturers: Edelmann, Hall, Prince, Serve, Wagner

# Bachelor of Science in Business Administration, Operations and Supply Chain Management (OSC) minimum 125 hours

The Common Academic Program (CAP) is an innovative curriculum that is the foundation of a University of Dayton education. It is a learning experience that is shared in common among all undergraduate students, regardless of their major. Some CAP requirements must be fulfilled by courses taken at UD (e.g., Capstone and Diversity and Social Justice). Some major requirements must also be fulfilled by courses taken at UD. Students should consult with their advisor regarding applicability of transfer credit to fulfill CAP and major program requirements.

**Common Academic Program (CAP)** [1]

| First-Year Humanities Commons [2] | | 12 cr. hrs. |
|---|---|---|
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| PHL 103 | Introduction to Philosophy | |
| ENG 100 | Writing Seminar I [3] | |
| Second-Year Writing Seminar [4] | | 0-3 cr. hrs. |
| ENG 200 | Writing Seminar II | |
| Oral Communication | | 3 cr. hrs. |
| CMM 100 | Principles of Oral Communication | |
| Mathematics | | 3 cr. hrs. |

| Social Science | | 3 cr. hrs. |
|---|---|---|
| SSC 200 | Social Science Integrated | |
| Arts | | 3 cr. hrs. |
| Natural Sciences [5] | | 7 cr. hrs. |
| Crossing Boundaries | | up to 12 cr. hrs. |
| Faith Traditions | | |
| Practical Ethical Action | | |
| Inquiry [6] | | |
| Integrative | | |
| Advanced Study | | |
| Philosophy and/or Religious Studies (6 cr. hrs.) | | |
| Historical Studies (3 cr. hrs.) [7] | | |
| Diversity and Social Justice [8] | | 3 cr. hrs. |
| Major Capstone [9] | | 0-6 cr. hrs. |

[1] The credit hours listed reflect what is needed to complete each CAP component. However, they should not be viewed as a cumulative addition to a student's degree requirements because many CAP courses are designed to satisfy more than one CAP component (e.g., Crossing Boundaries and Advanced Studies) and may also satisfy requirements in the student's major.
[2] May be completed with ASI 110 and ASI 120 through the Core Program.
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[4] May be completed with ENG 114 or ENG 198 or ASI 120.
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**SBA Core Curriculum** [1]

| ACC 207 | Introduction to Financial Accounting | 3 |
|---|---|---|
| ACC 208 | Introduction to Managerial Accounting | 3 |
| BIZ 101 | Business Education Planning [2] | 1 |
| BIZ 103 | Develop Your Vocation and Career Flight Plan [3] | 1 |
| BIZ 201 | Introduction to Business | 3 |
| BIZ 202 | Career Flight Takeoff [4] | 1 |

| BIZ 301 | Successfully Navigating Your Career Flight Plan | 1 |
|---|---|---|
| DSC 210 | Statistics for Business I [5] | 3 |
| or BAN 210 | Statistics for Business I | |
| DSC 211 | Statistics for Business II [5] | 3 |
| or BAN 211 | Statistics for Business II | |
| ECO 203 | Principles of Microeconomics | 3 |
| ECO 204 | Principles of Macroeconomics | 3 |
| ENG 370 | Report & Proposal Writing | 3 |
| or ENG 371 | Technical Communication | |
| or ENG 372 | Business and Professional Writing | |
| FIN 301 | Introduction to Financial Management | 3 |
| MGT 201 | Legal Environment of Business | 3 |
| MGT 301 | Organizational Behavior | 3 |
| MGT 490 | Managing the Enterprise | 3 |
| MTH 128 | Finite Mathematics | 3 |
| MTH 129 | Calculus for Business | 3 |
| MIS 301 | Information Systems in Organizations | 3 |
| MKT 301 | Principles of Marketing | 3 |
| OPS 301 | Survey of Operations & Supply Management | 3 |
| REL 368 | Christian Ethics & the Business World | 3 |
| or PHL 313 | Business Ethics | |
| ECO elective (300/400 level) | | 3 |
| BWISE requirement | | 0 |

[1] No more than two semester grades of D are allowed in the SBA Core Curriculum. When this threshold is violated, the course grade will not satisfy the SBA Core Curriculum requirement. A course may be taken again in order to demonstrate a grade above a D. The University policy regarding calculating GPA when a course is re-taken applies in these circumstances.

[2] Requirement is waived for students who transfer from other universities.

[3] Requirement is waived for students who transfer from other universities with more than 45 credit hours.

[4] Requirement is *optional* for students who transfer from other universities with more than 45 credit hours.

[5] Course offerings will transition from DSC to BAN no earlier than Fall 2024.

| Major Requirements | | 24 |
|---|---|---|
| DSC 375 | Management Science | 3 |
| OPS 350 | Business Process Management | 3 |
| OPS 401 | Operations Planning & Control | 3 |
| OPS 480 | Supply Chain Management Strategies | 3 |
| OPS 485 | Capstone Operations & Supply Management Project I | 1 |
| OPS 495 | Capstone Operations & Supply Management Project II (Satisfies CAP Major Capstone.) | 5 |
| OPS electives (Choose one option below): | | 6 |
| 1. Take 6 credits of OPS and/or DSC electives from the following: OPS 413 or 430 or 440 or 481 or 494; or DSC 313 or 435 or 494 | | |
| 2. Take 3 credits of OPS and/or DSC electives from the following: OPS 413 or 430 or 440 or 481 or 494; or DSC 313 or 435 or 494; and | | |
| Take MIS 303L, MIS 305, and MIS 307L | | |

3. Choose from 2 of the following:

a. Take 3 credits of OPS and/or DSC electives from the following: OPS 413 or 430 or 440 or 481 or 494; or DSC 313 or 435 or 494

b. Take 3 credits of MIS 303L, MIS 305, and MIS 307L

c. Take 3 credits of non-OPS or DSC electives from the following: 3 Credits in MIS 325 or 366 or 380 or 385 or 460 or 467; or ACC 303 or 404; or ECO 340 or 346 or 410 or 415 or 441 or 471; or FIN 401 or 430 or 450; or MGT 421; or MKT 406 or 408

**Academic electives to bring total to at least 125 credits**

# Minor in Operations and Supply Chain Management (OSC)

**Operations and Supply Management**

| Business Majors | | |
|---|---|---|
| DSC 375 | Management Science | 3 |
| OPS 350 | Business Process Management | 3 |
| OPS 401 | Operations Planning & Control | 3 |
| or OPS 480 | Supply Chain Management Strategies | |
| Select three semester hours from DSC, OPS, MIS, or IET [1] | | 3 |
| **Total Hours** | | **12** |

[1] Approved by the department chairperson.
MIS 365 may not be used as an elective for any minor in the MOA Department.

| Non-Business Majors | | |
|---|---|---|
| DSC 210 | Statistics for Business I | 3 |
| DSC 211 | Statistics for Business II | 3 |
| DSC 375 | Management Science | 3 |
| OPS 300 | Introduction to Operations & Supply Management | 3 |
| or OPS 301 | Survey of Operations & Supply Management | |
| OPS 350 | Business Process Management | 3 |
| OPS 401 | Operations Planning & Control | 3 |
| or OPS 480 | Supply Chain Management Strategies | |
| Select three semester hours from DSC, OPS, MIS, or IET [1] | | 3 |
| **Total Hours** | | **21** |

[1] Approved by department chairperson.

# Business Analytics (BAN)

The Department of Management Information Systems, Operations & Supply Chain Management, and Business Analytics offers courses in several quantitative and systems areas, a major and a minor in management information systems (see MIS), a major and minor in operations and supply chain management (see OSC), and minors in business analytics, business intelligence and cyber-security.

Business Analytics is the study of analysis, quantitative methodologies, and their application to the functional and behavioral problems of any organization. The major areas of study include applied statistics, operations research, and operations management. All business students take three business analytics and operations management courses as part of their core business coursework.

The minor in business analytics (BAN) offers business majors and other students an opportunity to develop skills in the quantitative methods supporting managerial decision making. A minor in business analytics consists of 21 semester hours for non-business majors and 12 hours for business majors.

Specific courses in other areas (e.g. mathematics) may be used. See department chairperson for approval.

## Faculty

Mark Jacobs, Chairperson
Professor Emeritus and Distinguished Service Professor: Bohlen, Dunne
Professors Emeriti: Amsden, Ferratt, Hoffer, Kanet, Wells
Sherman-Standard Register Professor of Cyber-security Management: Salisbury
Sherman-Standard Register Associate Professor of MIS: Wynn
Niehaus Chair in Business Analytics and Operations Management: Gorman
Professors: Enns, Gorman, Jacobs, Prasad, Salisbury
Associate Professors: Wynn
Assistant Professors: Hazen, Kim, Khorasani, Lee, Nittala, Raman, Sullivan, Zolbanin
Assistant Clinical Professor: Hvalshagen
Lecturers: Edelmann, Hall, Prince, Serve, Wagner

## Minor in Business Analytics (BAN)

A minor in Business Analytics consists of 12 hours for students in the School of Business Administration and 21 for non-business students.

### Business Analytics

| Business Majors | | |
|---|---|---|
| DSC 375 | Management Science | 3 |
| OPS 350 | Business Process Management | 3 |
| Select six semester hours from DSC, MIS, or OPS (300/400 level) [1,2,3] | | 6 |
| **Total Hours** | | **12** |

[1]  In addition to courses used to satisfy the requirements of any other major or minor. Approval of the department chairperson.
[2]   OPS majors must select nine additional semester hours instead of six.
[3]  MIS 365 may not be used as an elective for any minor in the MOA Department.

Non-Business majors

| DSC 210 | Statistics for Business I | 3 |
|---|---|---|
| DSC 211 | Statistics for Business II | 3 |
| DSC 375 | Management Science | 3 |
| MIS 300 | Survey of Management Information Systems | 3 |
| or MIS 301 | Information Systems in Organizations | |
| OPS 300 | Introduction to Operations & Supply Management | 3 |
| or OPS 301 | Survey of Operations & Supply Management | |
| OPS 350 | Business Process Management | 3 |
| Select three semester hours from DSC, OPS or MIS (300/400 level) | | 3 |
| **Total Hours** | | **21** |

## Business Analytics

**First Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| BIZ 101 | 1 | BIZ 103 | 1 |
| BIZ 201 | 3 | CMM 100 | 3 |
| ECO 203 | 3 | ECO 204 | 3 |
| MTH 128 | 3 | ENG 100 | 3 |
| PHL 103 | 3 | MTH 129 | 3 |
| HST 103 | 3 | REL 103 | 3 |
| | **16** | | **16** |

**Second Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| ACC 207 | 3 | ACC 208 | 3 |
| BIZ 202 | 1 | MIS 301 | 3 |
| ENG 200 | 3 | DSC 211 or BAN 211 | 3 |
| DSC 210 or BAN 210 | 3 | OPS 301 | 3 |
| MGT 201 | 3 | SSC 200 | 3 |
| CAP natural science and lab | 4 | | |
| | **17** | | **15** |

**Third Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| BIZ 301 | 1 | MIS 385 | 3 |
| BAN 313 | 3 | BAN 402 | 3 |
| BAN 302 | 3 | BAN Elective | 3 |
| MGT 301 | 3 | FIN 301 | 3 |
| MKT 301 | 3 | CAP Natural Science | 3 |
| CAP Advanced Historical Studies | 3 | | |
| | **16** | | **15** |

**Fourth Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| MIS 366 | 3 | BAN 495 | 3 |
| BAN 482 | 3 | ENG 372 | 3 |
| MGT 490 | 3 | CAP Arts | 3 |
| REL 368 | 3 | CAP Faith Traditions/Advanced Philosophy/Religious Studies | 3 |
| CAP Diversity & Social Justice | 3 | ECO Elective | 3 |
| | **15** | | **15** |

**Total credit hours: 125**

## Management Information Systems

**First Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| MIS 150 | 0 | BIZ 103 | 1 |
| BIZ 101 | 1 | CMM 100 | 3 |
| BIZ 201 | 3 | ECO 204 | 3 |
| ECO 203 | 3 | ENG 100 | 3 |
| MTH 128 | 3 | MTH 129 | 3 |
| PHL 103 | 3 | REL 103 | 3 |
| HST 103 | 3 | | |
| | **16** | | **16** |

**Second Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| ACC 207 | 3 | MIS 305 | 1 |
| BIZ 202 | 1 | ACC 208 | 3 |
| ENG 200 | 3 | MIS 301 | 3 |

| | Hours | | Hours |
|---|---|---|---|
| DSC 210 or BAN 210 | 3 | DSC 211 or BAN 211 | 3 |
| MGT 201 | 3 | SSC 200 | 3 |
| CAP Natural Science & Lab | 4 | CAP Natural Science | 3 |
| | **17** | | **16** |

**Third Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| BIZ 301 | 1 | MIS 325 | 4 |
| MIS 380 | 3 | MKT 301 | 3 |
| MIS 381 | 1 | FIN 301 | 3 |
| MIS 385 | 3 | MGT 301 | 3 |
| OPS 301 | 3 | REL 368 or PHL 313 | 3 |
| CAP Advanced Historical Studies | 3 | | |
| | **14** | | **16** |

**Fourth Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| MGT 490 | 3 | MIS 475 | 3 |
| MIS 465 | 3 | MIS Elective/Breadth Requirement | 3 |
| MIS Elective/Breadth Requirement | 3 | ENG 372 | 3 |
| ECO 300-400 Elective | 3 | CAP Diversity & Social Justice | 3 |
| CAP Faith Traditions/Advanced Philosophy/Religious Studies | 3 | CAP Arts Study | 3 |
| | **15** | | **15** |

**Total credit hours: 125**

# Operations & Supply Chain Management

**First Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| BIZ 101 | 1 | BIZ 103 | 1 |
| BIZ 201 | 3 | CMM 100 | 3 |
| ECO 203 | 3 | ECO 204 | 3 |
| MTH 128 | 3 | ENG 100 | 3 |
| PHL 103 | 3 | MTH 129 | 3 |
| HST 103 | 3 | REL 103 | 3 |
| | **16** | | **16** |

**Second Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| ACC 207 | 3 | ACC 208 | 3 |
| BIZ 202 | 1 | MGT 301 | 3 |
| ENG 200 | 3 | DSC 211 or BAN 211 | 3 |
| MGT 201 | 3 | OPS 301 | 3 |
| DSC 210 or BAN 210 | 3 | CAP Natural Science & Lab | 4 |
| SSC 200 | 3 | | |
| | **16** | | **16** |

**Third Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| DSC 375 | 3 | OPS 480 | 3 |
| OPS 401 | 3 | OPS 350 | 3 |
| MIS 301 | 3 | FIN 301 | 3 |
| MKT 301 | 3 | CAP Arts Study | 3 |
| CAP Advanced Historical Studies | 3 | CAP Natural Science | 3 |

| | Hours | | Hours |
|---|---|---|---|
| BIZ 301 | 1 | | |
| | **16** | | **15** |

**Fourth Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| OPS 485 | 1 | OPS 495 | 5 |
| OPS Elective | 3 | OPS Elective | 3 |
| MGT 490 | 3 | ENG 372 | 3 |
| REL 368 | 3 | CAP Faith Traditions/ Advanced Philosophy/ Religious Studies | 3 |
| ECO 300-400 Elective | 3 | | |
| CAP Diversity & Social Justice | 3 | | |
| | **16** | | **14** |

**Total credit hours: 125**

## Business Analytics Courses

### BAN 211. Statistics for Business II. 3 Hours
Tests of hypotheses, analysis of variance, Chi-square tests, simple and multiple regression and correlation. Use of computer software for statistical data analysis. Prerequisites: MTH 129 or MTH 148 or MTH 168; BIZ 200 or BIZ 201; DSC 210 or BAN 210.

### BAN 302. Introduction to Programming for Analytics. 3 Hours
Programming and data wrangling using contemporary languages such as Python and R.

### BAN 313. Advanced Business Statistics. 3 Hours
Selected topics from advanced statistics with emphasis on business applications. Prerequisites: DSC 211 or equivalent.

### BAN 402. Prescriptive Analytics. 3 Hours
Introduction to linear programming using contemporary languages such as Python and R.

### BAN 482. Predictive Analytics. 3 Hours
Linear regression, logistic regression, clustering and dimensional reduction using contemporary languages such as R and Python.

### BAN 495. Business Analytics Capstone. 3 Hours
This course centers on the execution of an experiential project applying business analytics concepts and techniques to practical problems with faculty supervision. Student teams address significant business problems and opportunities in service and manufacturing firms. Teams write recommendation/implementation reports and make presentations of their work. Students are guided to reflect about how their UD educational experience has influenced understanding of their major in terms of vocation.

## Decision Sciences Courses

### DSC 210. Statistics for Business I. 3 Hours
Basic concepts of statistics including descriptive statistics, probability, probability distributions, and estimation. Prerequisites: MTH 129 or MTH 148 or MTH 168; BIZ 200 or BIZ 201 (may be taken as a corequisite).

### DSC 211. Statistics for Business II. 3 Hours
Tests of hypotheses, analysis of variance, Chi-square tests, simple and multiple regression and correlation. Use of computer software for statistical data analysis. Prerequisites: MTH 129 or MTH 148 or MTH 168; BIZ 200 or BIZ 201; DSC 210.

### DSC 313. Advanced Business Statistics. 3 Hours
Selected topics from advanced statistics with emphasis on business applications. Prerequisite(s): DSC 211 or equivalent.

**DSC 375. Management Science. 3 Hours**
Quantitative modeling applications for managerial analysis and decision making. Develops skills to analyze and solve problems using computer-based mathematical modeling in a wide variety of business decision situations involving business functional areas such as accounting, economics, finance, human resources, marketing, management information systems, and operations management. Topics include constrained modeling techniques, simulation, and multi-criteria decision making. Prerequisites: DSC 211.

**DSC 410. Decision Theory. 3 Hours**
Introduction to the analysis of decisions under uncertainty. Topics include structuring of the decision process, Bayesian decision theory, and multicriteria decision making. Prerequisite(s): DSC 211 or equivalent.

**DSC 415. Simulation Modeling & Analysis. 3 Hours**
Introduction to simulation models in support of business decision making. Emphasis on building and analyzing models in a variety of applications, including manufacturing and service systems. Study and use of a simulation language. Prerequisite(s): DSC 211; DSC 375 recommended.

**DSC 435. Analysis of Factory Systems. 3 Hours**
Concepts and techniques for the analysis, design, and management of factory production systems. Work-flow layout, scheduling techniques, stochastic process models, simulations, and computerized factory models Prerequisite(s): DSC 375, OPS 301.

**DSC 491. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent original research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**DSC 492. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent original research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**DSC 494. Seminar in Decision Sciences. 3 Hours**
Study of selected topics or issues in applied statistics, quantitative business analysis, and production and operations management. Topics vary from time to time. May be taken more than once if topics change. Title will reflect topics covered in a particular offering.

**DSC 497. Laboratory Work Experience. 1-6 Hours**
Under faculty sponsorship and in association with a participating industrial, commercial, educational, health-care, or governmental organization, practical experience in work associated with the student's minor concentration. (See internship coordinator for details.) Does not satisfy MIS elective. Permission of chairperson required. Prerequisite(s): Permission of department chairperson.

**DSC 498. Cooperative Education. 3 Hours**
Optional full-time work period off campus alternating with study period on campus. Prerequisite(s): Permission of department chairperson.

**DSC 499. Independent Study in Decision Sciences. 1-6 Hours**
Research in conjunction with a faculty member on a subject within the general area of decision sciences. Normally open only to juniors and seniors who have attained a cumulative grade-point average of 3.0 or above. Permission of chairperson required. Prerequisite(s): Permission of department chairperson.

## Management Info Systems Courses

**MIS 150. Professional Development Experiences in Information Systems. 0 Hours**
Participation in experiences to promote development of practical knowledge, career networks, and professional skills relevant to the field of information systems.

**MIS 203L. Introduction to Spreadsheets. 1 Hour**
Introduction to electronic spreadsheet software (e.g., Microsoft Excel) skills. Prerequisites: BIZ 200 or BIZ 201 or permission.

**MIS 220. Exploring Careers in Information Systems. 1 Hour**
Designed to immerse students into the contemporary issues of management information systems. Site visits and guest lectures from management information systems leaders. Priority given to first and second year students. Satisfactory/No Credit. Prerequisite(s): Permission of department chairperson.

**MIS 300. Survey of Management Information Systems. 3 Hours**
Introduction to management information systems concepts, terminology, purposes, and applications for the nonbusiness student. Not open to students in the School of Business Administration or to those with credit in MIS 301. Permission of department chairperson required. Prerequisites: Junior standing.

**MIS 301. Information Systems in Organizations. 3 Hours**
Survey of theory and applications of computer-based information systems in organizations. The role of information in organizational processes, current information technology, decision support systems, and end-user computing and distributed processing systems. Sophomores are encouraged to take this course during their second term. Prerequisites: BIZ 200 or BIZ 201 and Business majors only.

**MIS 302. Systems Thinking in Organizations. 3 Hours**
Focus on understanding systems thinking, decision making, and information systems in organizations. Learn general systems concepts, system diagramming tools, and different approaches to systems thinking as a mode of inquiry. Compare modes of inquiry. Develop a learning community to build knowledge. Apply knowledge by (1) analyzing organizations as systems and the information systems and technologies used to support decision making and (2) suggesting improvements. Prerequisite(s): Completed 45 semester hours.

**MIS 303L. Using Spreadsheets in Business. 1 Hour**
Use of electronic spreadsheets (e.g., Microsoft Excel) as a tool to support business decision making. Prerequisite(s): BIZ 200 or BIZ 201 or MIS 203L or permission.

**MIS 305. Introduction to Business Applications: Problem Solving with Visual Tools. 1 Hour**
Introduction to basic programming structures, graphical user interface design, and other tools using a visual programming language such as Visual Basic.net. Prerequisite(s): BIZ 100 or BIZ 102 or BIZ 200 or BIZ 201 or equivalent.

**MIS 307L. Developing Spreadsheet Applications. 1 Hour**
Application of computer programming concepts to the spreadsheet environment. Development of full-featured spreadsheet applications. Prerequisite(s): MIS 303L, MIS 305.

**MIS 325. Programming for Business Systems. 4 Hours**
Process of software development for business system implementation. Fundamental object-oriented programming concepts include program design, documentation, development, and testing of computer solutions for business problems using a modern programming language, such as Java. Prerequisite(s): MIS 305.

**MIS 360. E-Commerce Processes & Technology. 3 Hours**
Introduction to information systems technologies and techniques that enable business-to-business and business-to-consumer electronic relationships. Development of interactive websites with an introduction to client- and server-side scripting and simple database access. Prerequisite(s): (MIS 300 or MIS 301); (MIS 305 or equivalent); (BAI 103L or equivalent HTML knowledge).

**MIS 365. Protecting Personal Information Resources in an Interconnected World. 3 Hours**
In an increasingly interconnected world, threats to the confidentiality, integrity and availability of valuable information resources are increasingly salient. This creates particular challenges for the individual who wishes to put online resources to their fullest use. This course will identify threats to confidentiality, integrity and availability of information resources, and how individuals can put in place appropriate controls to protect their personal information. Some discussion of how these basic concepts apply in organizational membership will also be discussed. Not available as elective for MIS majors. This course may not be used as an elective for any minor in the MOA department (e.g. CSM, BIN, MIS, OPS, BAN).

**MIS 366. Business Intelligence. 3 Hours**
The use of computer-based data analysis tools to support managers in problem solving and decision making. Prerequisites: DSC 211; MIS 300 or MIS 301. Corequisites: MIS 385.

**MIS 368. Principles of Information Security Management. 3 Hours**
Addresses issues relevant to creating a systematic information assurance, compliance control structure and systematic security procedures. Information security policy, assets, physical and logical information resource security, business continuity, and compliance with relevant security standards are covered. Prerequisite(s): MIS 300 or MIS 301.

**MIS 380. Systems Analysis & Re-Engineering. 3 Hours**
Concepts, methods, techniques, and tools needed to initiate a systems development project and to conduct the requirements collection, analysis, and structuring activities of systems development. Structured life cycle and alternatives. Re-engineering business processes through information systems. Prerequisite(s): MIS 300 or MIS 301; MIS 385 (may be taken as a corequisite); Business majors only or permission of department chairperson. Corequisite(s): MIS 381.

**MIS 381. Principles of Project Management. 1 Hour**
Introduction to project management concepts and ideas. Possible use of an existing team project from another course to learn principles of scheduling, team management, client management, etc., emphasizing best project management practices. Prerequisite(s): MIS 300 or MIS 301.

**MIS 385. Systems Implementation with Database Management Systems. 3 Hours**
Concepts, techniques, and tools to convert a logical system design into a working application using a relational DBMS. File and data structures, logical and physical database design, security and data integrity, file design and processing. DBMS functions, SQL, 3GL and 4GL access to databases, linkage to WWW pages, database architectures, CASE. Prerequisite(s): MIS 300 or MIS 301; MIS 305 (may be taken as a corequisite).

**MIS 410. Object-Oriented Analysis & Design. 3 Hours**
Introduction to object-oriented concepts and techniques for analyzing and designing systems. Systems development project using an object-oriented CASE tool. Prerequisite(s): MIS 301 or permission of instructor; MIS 305 recommended.

**MIS 420. Expert & Knowledge-Based Systems. 3 Hours**
Introduction to artificial intelligence and expert and knowledge-based systems; knowledge acquisition, implementation, and validation; advanced topics; applications to business. Use of expert system software. Prerequisite(s): BAI 103L or equivalent; DSC 375 recommended.

**MIS 425. Information for Total Quality. 3 Hours**
Theory and practice of total quality management (TQM); applications of TQM in the information systems function, information system requirements for TQM programs. Prerequisite(s): MIS 301; OPS 301.

**MIS 430. Telecommunications & Networking. 3 Hours**
Introduction to computer-based communication networks, underlying concepts, basic hardware components and operating systems, network architectures and protocols, data integrity and security, message routing, network management. Prerequisite(s): MIS 368 (may be taken as corequisite).

**MIS 460. Advanced Web Development. 3 Hours**
Study of web development concepts and techniques. Design and development of dynamic web-sites using technologies such as ASP.NET. Prerequisite(s): MIS 305 or equivalent.

**MIS 461. E-Business. 3 Hours**
Models of how to conduct business electronically. Topics include different forms of e-business, products and services provided on the Internet, how to combine electronic business with brick-and-mortar business, and keys to success for electronically enhanced businesses. Prerequisite(s): MIS 301.

**MIS 465. MIS Project I-Analysis & Design in Teams. 3 Hours**
First of a two-course sequence. Team participation/management and project management skills. Apply these skills in teams to perform an analysis and preliminary re-design of an existing organization's information system. Emphasis on written and oral communications, including team-prepared reports and presentations. Offered fall semester only. Prerequisite(s): MIS 325, MIS 380, MIS 381, MIS 385.

**MIS 467. Data Warehousing. 3 Hours**
Purpose, design, implementation, and effective use of data warehouses and data warehousing technologies. Topics include data warehouse design, data marts, data quality management, extract-transform-load process, and business intelligence. Prerequisite(s): MIS 300 or MIS 301, MIS 385.

**MIS 468. Internet Security. 3 Hours**
This course provides students with an understanding of both defensive and offensive issues of information security. The course includes instruction on information security theory, psychological operations, hacking, viruses, and systems management. The course emphasizes security for e-commerce on the Internet. Prerequisite(s): MIS 430.

**MIS 475. MIS Project II-Design & Implementation in Teams. 3 Hours**
Continuation of MIS 465. With its organizational client, each team carries its project as far as possible toward final design and actual implementation. Students are guided to reflect about how their UD educational experience has influenced understanding of their major in terms of vocation. Emphasis on written and oral communications, including team-prepared reports and presentations. Offered spring semester only. Prerequisite(s): MIS 150, MIS 465.

**MIS 491. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent original research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**MIS 492. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent original research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**MIS 494. Seminar in Management Information Systems. 1-4 Hours**
Study of selected technical and/or organizational issues in information systems. Topics vary from time to time. May be taken more than once if topics change. Title will reflect topics covered in a particular offering.

**MIS 497. Laboratory Work Experience. 1-6 Hours**
Under faculty sponsorship and in association with a participating industrial, commercial, educational, health-care, or governmental organization; practical experience in work associated with the student's major concentration. (See internship coordinator for details.) Prerequisite(s): Permission of department chairperson.

**MIS 498. Cooperative Education. 1-6 Hours**
Optional full-time work period off campus alternating with study period on campus. (See Chapter X; consult Cooperative Education Office for details.) Prerequisite(s): Permission of department chairperson.

**MIS 499. Independent Study in Management Information Systems. 1-6 Hours**
Research in conjunction with a faculty member on a subject within the general area of management information systems. Open only to juniors or seniors who have attained a cumulative grade point average of 3.0 or above. Prerequisite(s): Permission of department chairperson.

## Operations Management Courses

**OPS 220. Experiences in Operations & Supply Management. 1 Hour**
Designed to immerse students into the contemporary issues of operations and supply management. Site visits and guest lectures from operations management leaders. Priority given to first and second year students. Satisfactory/No Credit. Prerequisite(s): Permission of department chairperson.

**OPS 300. Introduction to Operations & Supply Management. 3 Hours**
Concepts and OPS software-based techniques of designing, implementing, managing, and improving operations in manufacturing and service organizations, including project management, services systems design, resource allocation modeling, facility location, layout, aggregate planning, scheduling, and material requirements planning. Survey of major OPS strategies such as: just-in-time production, total quality management, business process reengineering, synchronous manufacturing, enterprise resource planning, and supply chain management. Not open to students in the School of Business Administration or to those with credit in OPS 301. Student must show aptitude in quantitative materials. Prerequisites: (MTH 207 or equivalent); junior standing.

**OPS 301. Survey of Operations & Supply Management. 3 Hours**
Concepts and OPS software-based techniques of designing, implementing, managing, and improving operations in manufacturing and service organizations, including project management, service systems design, resource allocation modeling, facility location, layout, aggregate planning, scheduling, and material requirements planning. Survey of major OPS strategies such as: just-in-time production, total quality management, business process reengineering, synchronous manufacturing, enterprise resource planning, and supply chain management. Business majors only. Prerequisite(s): (BIZ 200 or BIZ 201); DSC 211 (may be taken as a corequisite).

**OPS 350. Business Process Management. 3 Hours**
Analytical and empirical tools for evaluation of operations in manufacturing/service firms. Analytical methods may include flow diagrams, Little's Law, queuing theory, theoretical flow times, critical path networks, resource capacity, and estimates of system flow. Empirical methods include quality sampling and discrete event simulation. Students receive training in simulation software. Projects or case studies require creative problem solving for realist business problems. Prerequisites: OPS 301 or OPS 300.

**OPS 401. Operations Planning & Control. 3 Hours**
Concepts and techniques in the planning and control of operations. Advanced treatment topics include: forecasting for operations, operations sequencing and scheduling, inventory and production control, production planning system design, MRP/ERP, warehouse management, purchasing and physical distribution, balanced attention to technical as well as the managerial aspects of operations planning and control. Prerequisites: OPS 301.

**OPS 413. Project Management. 3 Hours**
Broad coverage of technical and human management issues in projects. Emphasis on project planning, scheduling, tracking, and close-down. Task time and cost estimation and description. Use of computer software. Team building and other aspects of managing project teams. Prerequisite(s): OPS 301.

**OPS 430. Quality & Just in Time Manufacturing. 3 Hours**
The concepts of just-in-time manufacturing, total quality system, and statistical process control. Projects, tours, and guest speakers. Prerequisite(s): OPS 301.

**OPS 440. Continuous Improvement. 3 Hours**
Theory and practice of continuous improvement especially as applied in manufacturing; comparison to the traditional operations management approach, tools and techniques, the KAIZEN approach. Prerequisite(s): OPS 301.

**OPS 480. Supply Chain Management Strategies. 3 Hours**
Concepts, analytical techniques, and solution methods for designing and managing integrated supply chains. Strategic issues of integrated supply chain design and management, including inventory management, logistics network design, distribution systems, strategic alliances, value of information for centralized decisions and risk-pooling, information technology and decision support, and international supply chain management. Prerequisites: OPS 301, DSC 375.

**OPS 481. Principles of Procurement. 3 Hours**
Examination of strategic issues in procurement, purchasing documents and processes, the procurement cycle, supplier management programs, negotiations, sourcing, and value analysis. Prerequisite(s): OPS 301.

**OPS 482. Supply Chain Analytics. 3 Hours**
Overview of decision making in supply chain management. Problem solving steps and algorithms. Introduction to specialized data analytics software. Emphasis on predictive analytics. Prerequisites: OPS 301.

**OPS 485. Capstone Operations & Supply Management Project I. 1 Hour**
This course centers on the preparation for an experiential operations improvement project. Students evaluate real-world project proposals from clients, develop clear understanding of operations improvement opportunities, and select projects at hand. Student teams learn about process improvement project design and develop well-defined project plans for execution in OPS 495. Students taking OPS 485 in the fall must take OPS 495 in the subsequent spring semester. Corequisites: OPS 350, OPS 401, OPS 480.

**OPS 491. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent and original research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**OPS 492. Honors Thesis. 3 Hours**
Selection, design, investigation, and completion of an independent original, research thesis under the guidance of a departmental faculty member. Restricted to students in the University Honors Program with permission of the director of the program and the departmental chairperson.

**OPS 494. Seminar in Operations & Supply Management. 3 Hours**
Study of selected topics or issues in operations management. Topics vary from time to time. May be taken more than once if topics change. Title will reflect topics covered in a particular offering.

**OPS 495. Capstone Operations & Supply Management Project II. 5 Hours**
This course centers on the execution of an experiential project applying operations and supply management concepts and techniques to practical problems with faculty supervision. Student teams address significant operational problems and opportunities in real-world service and manufacturing firms. Teams write recommendation/implementation reports and make presentations of their work. Students are guided to reflect about how their UD educational experience has influenced understanding of their major in terms of vocation. Prerequisites: OPS 485.

**OPS 497. Laboratory Work Experience. 1-6 Hours**
Under faculty sponsorship and in association with a participating industrial, commercial, educational, health-care, government, or other organization, practical experience in work associated with the student's major. (See internship coordinator for details.) May satisfy OPS elective, with chairperson approval.

**OPS 498. Cooperative Education. 1-6 Hours**
Optional full-time work period off campus alternating with study period on campus. (See Chapter X; consult Cooperative Education Office for details). Permission of chairperson required.

**OPS 499. Independent Study in Operations & Supply Management. 1-6 Hours**
Research in conjunction with a faculty member on a subject within the general area of operations management. Normally open only to juniors and seniors who have attained a cumulative grade-point average of 3.0 or above. Permission of chairperson required.