



Indiana State University Job Growth Report

STRATEGIC PLAN QUESTION SUBCOMMITTEE REPORT

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Executive Summary

As Indiana State University is preparing for its next strategic planning process, the university has created more than 20 “Question Committees” to answer an array of questions and provide research that will inform the strategic planning process. The data in the following pages provides guidance to one such committee to answer the following questions:

- *What areas of our economy are going to see significant job growth in the future?*
- *What new degree programs & job skills, are needed to meet the new demands?*

Based on aggregating data from EMSI, O*NET, and IPEDS, we examined job projections across the state of Indiana for 2015-2023 and the degrees related to these jobs. The following recommendations are made based upon data suggesting that there is an expected gap in job opportunities related to these degrees and the number of Hoosiers graduating with these degrees in the near future. Additional methodology and data to support each suggestion is included in this report.

Computer Science and Technology

- Computer Systems Networking and Telecommunications
- Computer and Information Systems Security/Information Assurance
- Cyber/Computer Forensics and Counterterrorism
- Information Technology
- Information Technology Project Management
- Game and Interactive Media Design
- Modeling, Virtual Environments and Simulation
- Informatics
- Bioinformatics
- Medical Informatics

Engineering

- Civil Engineering
- Construction Engineering
- Geotechnical and Geoenvironmental Engineering

Health Related Fields

- Clinical/Medical Social Work
- Health Communication
- Health/Health Care Administration/Management

Other Degrees of Interest

- Digital Arts
- Environmental Education
- Logistics, Materials, and Supply Chain Management

Explanation of the data analysis.

EMSI job projections data was used to project anticipated openings in Indiana between 2015-2023. IPEDS data was used to identify all degree options completed at a national, state, and university (ISU) specific level in 2013 (the most recent data available). O*NET data was then used to connect each degree to the occupations that most commonly hired that specific degree type. More than 1100 academic majors in the integrated data table were sorted based on the following criteria:

- Column F, High “combined target occupations state 2015-2023 average annual openings (growth and replacement)”
 - Based on the number of related occupations, this is the anticipated number of job openings over the next 8 years in Indiana for students with this major
- Column G, Low “Indiana degree awards per combined target occupation openings”
 - Total number of degrees awarded in Indiana per anticipated openings ((Column D + Column E)/ Column F)
- Column H, Low, “ISU % of total degree awards”
 - Percentage of degrees in a given major that ISU is awarding compared to state total

The table below represents a subset of this data.

A	B	C	D	E	F	G	H	I
Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	Combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	Number of related occupations
77	11.0101	Computer and Information Sciences, General	9	804	977.2	0.822759	1.12%	7
123	11.0102	Artificial Intelligence	0	0	565.7	0	0.00%	3
41	11.0103	Information Technology	36	911	1227.6	0.742098	3.95%	7
123	11.0104	Informatics	0	265	565.7	0.468446	0.00%	3

In the example above, Computer and Information Sciences, General ranked 77th out of the top 300 majors determined through the sorting mechanism described above.

Based on this data,

- 9 students graduated from ISU with a Computer and Information Sciences degree in 2013; 804 graduated at universities across the state in the same year.
- We can anticipate 977 job openings for students with a Computer and Information Sciences degree in Indiana in the next 8 years and if enrollment stays flat, there will be less than one graduate in our state (0.82) for each opening.

After sorting, based on the criteria listed above, the top 300 academic majors were reviewed to determine where there may be areas for program development or program growth at Indiana State University. The recommendations that follow are based on looking at total anticipated job openings (column F) and Indiana degrees awarded per anticipated job opening (Column G) as well as the number of degrees that ISU is offering in a given field and the number of degrees being granted across the state.

Descriptors for each major and suggestions for related majors are based on the CIP code and were generated from IPEDS.

What does the data tell us?

While occupations requiring a business degree are anticipated to be where the largest number of job openings will be, this is an area with close to two students graduating each year for each job opening in Indiana. With this in mind, we need to explore career/program opportunities where there is high demand (job opportunity) and a low production rate (relative to job openings).

Potential Areas for growth areas for growth and related data is on the following pages.

Computer Science and Technology

Computer Systems Networking and Telecommunications

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
126	11.0901	Computer Systems Networking and Telecommunications	0	141	556.7	0.253278	0.00%	4

Description of Major:

A program that focuses on the design, implementation, and management of linked systems of computers, peripherals, and associated software to maximize efficiency and productivity, and that prepares individuals to function as network specialists and managers at various levels. Includes instruction in operating systems and applications; systems design and analysis; networking theory and solutions; types of networks; network management and control; network and flow optimization; security; configuring; and troubleshooting.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1143	Computer Network Architects	\$50,830	\$62,161
15-1121	Computer Systems Analysts	\$45,480	\$55,646
15-1122	Information Security Analysts	\$46,590	\$54,832
15-1152	Computer Network Support Specialists	\$34,780	\$58,583

Computer and Information Systems Security/Information Assurance

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
115	11.1003	Computer and Information Systems Security/Information Assurance	0	170	641.5	0.265004	0.00%	6

Description of Major:

A program that prepares individuals to assess the security needs of computer and network systems, recommend safeguard solutions, and manage the implementation and maintenance of security devices, systems, and procedures. Includes instruction in computer architecture, programming, and systems analysis; networking; telecommunications; cryptography; security system design; applicable law and regulations; risk assessment and policy analysis; contingency planning; user access issues; investigation techniques; and troubleshooting.

Related Major: 43.0116, Cyber/Computer Forensics and Counterterrorism

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1143	Computer Network Architects	\$50,830	\$62,161
15-1142	Network and Computer Systems Administrators	\$40,930	\$58,926
15-1141	Database Administrators	\$40,260	\$61,410
15-1122	Information Security Analysts	\$46,590	\$54,832
11-3021	Computer and Information Systems Managers	\$65,690	\$76,055
15-1152	Computer Network Support Specialists	\$34,780	\$58,583

Cyber/Computer Forensics and Counterterrorism

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	isu % of total degree awards	number of related occupations
477	43.0116	Cyber/Computer Forensics and Counterterrorism	0	0	184.7	0	0.00%	4

Description of Major:

A program focusing on the principles and techniques used to identify, search, seize and analyze digital media and to conduct cyber investigations against criminal and terrorist activity. Includes instruction in computer boot processes and drives, jumper setting, file access and reconstruction, hacking, network systems, cryptography, programming, investigative techniques, forensic imagery, web-based investigation methods, cyberterrorism, and applicable laws and administrative procedures.

Related Major: 11.1003, Computer and Information Systems Security.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
33-9021	Private Detectives	\$52,880	\$40,108
33-3021	Detectives and Criminal Investigators	\$38,180	\$54,260
15-1199	Computer Occupations, All Other	\$34,810	\$61,238
15-1122	Information Security Analysts	\$46,590	\$54,832

Information Technology

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
41	11.0103	Information Technology	36	911	1227.6	0.742098	3.80%	

Description of Major:

A program that focuses on the design of technological information systems, including computing systems, as solutions to business and research data and communications support needs. Includes instruction in the principles of computer hardware and software components, algorithms, databases, telecommunications, user tactics, application testing, and human interface design.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1143	Computer Network Architects	\$50,830	\$62,161
15-1121	Computer Systems Analysts	\$45,480	\$55,646
15-1122	Information Security Analysts	\$46,590	\$54,832
15-1111	Computer and Information Research Scientists	\$63,420	\$63,652
11-3021	Computer and Information Systems Managers	\$65,690	\$76,055
15-1132	Software Developers, Applications	\$52,400	\$85,327
15-1133	Software Developers, Systems Software	\$51,160	\$83,634

Information Technology Project Management

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
109	11.1005	Information Technology Project Management	0	1	664.2	0.001506	0.00%	4

Description of Major:

A program that prepares individuals to design, develop, and manage information technology projects in a variety of companies and organizations. Includes instruction in principles of project management, risk management, procurement and contract management, information security management, software management, organizational principles and behavior, communications, quality assurance, financial analysis, leadership, and team effectiveness.

Related Major: 52.0211, Project Management

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1199	Computer Occupations, All Other	\$34,810	\$61,238
15-1122	Information Security Analysts	\$46,590	\$54,832
11-3021	Computer and Information Systems Managers	\$65,690	\$76,055
11-9199	Managers, All Other	\$34,330	\$50,842

Game and Interactive Media Design

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	isu % of total degree awards	number of related occupations
1044	50.0411	Game and Interactive Media Design	0	6	13	0.461538	0.00%	1

Description of Major: A program that focuses on the design, development, and programming of interactive media entertainment, including computer and video games, virtual environments, Internet applications, and other interactive media. Includes instruction in theory of games, turn-based games, real-time games, visual and interactive design, story development, animation, simulation, and programming.

Related Major: Associated Careers: 11.0804, Modeling, Virtual Environments and Simulation

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
27-1014	Multimedia Artists and Animators	\$32,360	\$54,462

Modeling, Virtual Environments and Simulation

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
119	11.0804	Modeling, Virtual Environments and Simulation	0	0	601	0	0.00%	4

Description of Major:

A program focusing on the principles of applied visual simulation technology and the application of quantitative analyses to human-computer interaction. Includes instruction in object-oriented programming, artificial intelligence, computer communications and networks, computer graphics, virtual worlds and simulation systems, probability, statistics, stochastic modeling, data analysis, human-performance evaluation, and human-behavior modeling.

Related Major: 50.0411, Game and Interactive Media Design

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1131	Computer Programmers	\$39,350	\$59,121
15-1111	Computer and Information Research Scientists	\$63,420	\$63,652
27-1014	Multimedia Artists and Animators	\$32,360	\$54,462
15-1132	Software Developers, Applications	\$52,400	\$85,327

Informatics

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
123	11.0104	Informatics	0	265	565.7	0.468446	0.00%	3

Description of Major:

A program that focuses on computer systems from a user-centered perspective and studies the structure, behavior and interactions of natural and artificial systems that store, process and communicate information. Includes instruction in information sciences, human computer interaction, information system analysis and design, telecommunications structure and information architecture and management.

Related Majors: 26.1103), Bioinformatics; 51.2706, Medical Informatics.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1111	Computer and Information Research Scientists	\$63,420	\$63,652
15-1132	Software Developers, Applications	\$52,400	\$85,327
15-1133	Software Developers, Systems Software	\$51,160	\$83,634

Bioinformatics

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	isu % of total degree awards	number of related occupations
140	26.1103	Bioinformatics	0	20	471.6	0.042409	0.00%	3

Description of Major:

A program that focuses on the application of computer-based technologies and services to biological, biomedical, and biotechnology research. Includes instruction in algorithms, network architecture, principles of software design, human interface design, usability studies, search strategies, database management and data mining, digital image processing, computer graphics and animation, CAD, computer programming, and applications to experimental design and analysis and to specific quantitative, modeling, and analytical studies in the various biological specializations.

Related Majors: 1.0104, Informatics; 51.2706, Medical Informatics

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1199	Computer Occupations, All Other	\$34,810	\$61,238
15-1111	Computer and Information Research Scientists	\$63,420	\$63,652
15-1132	Software Developers, Applications	\$52,400	\$85,327

Medical Informatics

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
140	51.2706	Medical Informatics	0	35	471.6	0.074215	0.00%	3

Description of Major:

A program that focuses on the application of computer science and software engineering to medical research and clinical information technology support, and the development of advanced imaging, database, and decision systems. Includes instruction in computer science, health information systems architecture, medical knowledge structures, medical language and image processing, quantitative medical decision modeling, imaging techniques, electronic medical records, medical research systems, clinical decision support, and informatics aspects of specific research and practice problems.

Related Majors: 11.0104, Informatics; 26.1103, Bioinformatics

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
15-1199	Computer Occupations, All Other	\$34,810	\$61,238
15-1111	Computer and Information Research Scientists	\$63,420	\$63,652
15-1132	Software Developers, Applications	\$52,400	\$85,327

Engineering

Civil Engineering

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
357	14.0801	Civil Engineering, General	0	466	287.7	1.619743	0.00%	2

Description of Major:

A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of structural, load-bearing, material moving, transportation, water resource, and material control systems; and environmental safety measures.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
17-2051	Civil Engineers	\$49,230	\$66,226
11-9041	Architectural and Engineering Managers	\$73,390	\$102,862

Construction Engineering

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
118	14.3301	Construction Engineering	0	15	605.8	0.024761	0.00%	4

Description of Major:

A program that prepares individuals to apply scientific, mathematical, and management principles to the planning, design, and building of facilities and structures. Includes instruction in civil engineering, structural principles, site analysis, computer-assisted design, geology, evaluation and testing, materials, contracting, project management, graphic communications, and applicable laws and regulations.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
17-2051	Civil Engineers	\$49,230	\$66,226
13-1051	Cost Estimators	\$33,480	\$39,478
11-9041	Architectural and Engineering Managers	\$73,390	\$102,862
17-2199	Engineers, All Other	\$44,770	\$64,408

Geotechnical and Geoenvironmental Engineering

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
170	14.0802	Geotechnical and Geoenvironmental Engineering	0	0	392.5	0	0.00%	6

Description of Major:

A program that prepares individuals to apply geotechnical engineering methods, which deal with the analysis, design and construction of earth and earth supported structures, to the application of environmental problems, such as waste containment, waste disposal, construction of landfills, soil permeation, soil analysis, and soil improvement. Includes instruction in soil mechanics, soil dynamics, soil behavior, waste management and containment systems, geosynthetics, geochemistry, earth structures, geoenvironmental engineering, geotechnical engineering, earthquake engineering, and foundation engineering.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
17-2081	Environmental Engineers	\$47,000	\$71,872
17-2051	Civil Engineers	\$49,230	\$66,226
11-9041	Architectural and Engineering Managers	\$73,390	\$102,862
17-2199	Engineers, All Other	\$44,770	\$64,408
17-2171	Petroleum Engineers	\$73,990	\$123,989
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers	\$47,330	\$63,869

Health Related Fields

Clinical/Medical Social Work

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
128	51.1503	Clinical/Medical Social Work	0	116	540.1	0.214775	0.00%	4

Description of Major:

A program that prepares individuals for the specialized professional practice of social work, in collaboration with other health care professionals, in hospitals and other health care facilities and organizations. Includes instruction in social work, psychiatric case work, clinical interviewing techniques, therapeutic intervention strategies, patient testing and evaluation, patient and family counseling, social rehabilitation, patient care planning, record-keeping, and support services liaison.

Related Major: 44.0701, Social Work

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
21-1022	Healthcare Social Workers	\$28,830	\$41,733
21-1023	Mental Health and Substance Abuse Social Workers	\$25,560	\$36,236
21-1011	Substance Abuse and Behavioral Disorder Counselors	\$25,130	\$36,703
21-1014	Mental Health Counselors	\$28,780	\$39,366

Health Communication

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
414	09.0905	Health Communication	0	0	237.1	0	0.00%	3

Description of Major:

A program that focuses on how people, individually and collectively, understand and accommodate to health and illness and the role of communication and media in shaping professional health care messages and public acceptance of these messages. Includes instruction in the development and use of health-related and care-related messages and media; the goals and strategies of health care promotion; relationships, roles, situations, and social structures in the context of health maintenance and promotion; and applications to disease prevention, health advocacy, and communications concerning treatments.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
27-3031	Public Relations Specialists	\$26,200	\$42,709
21-1091	Health Educators	\$25,360	\$40,568
21-1094	Community Health Workers	\$23,830	\$27,038

Health/Health Care Administration/Management

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
274	51.0701	Health/Health Care Administration/Management	0	627	369.4	1.697347	0.00%	1

Description of Major:

A program that prepares individuals to develop, plan, and manage health care operations and services within health care facilities and across health care systems. Includes instruction in planning, business management, financial management, public relations, human resources management, health care systems operation and management, health care resource allocation and policy making, health law and regulations, and applications to specific types of health care services.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
11-9111	Medical and Health Services Managers	\$47,540	\$63,456

Other Degrees of Interest

Digital Arts

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
433	50.0102	Digital Arts	0	6	210.1	0.028558	0.00%	5

Description of Major:

A general, undifferentiated program that focuses on the use of computerized digital images as the primary medium of expression in the visual and performing arts, and that may prepare individuals for a wide variety of careers using new media, including graphic design, digital animation, motion graphics, 3D visualization, game and interactive media design, music and sound design, video production, web design, photography, and other fields.

Related Major: 09.0702, Digital Communication and Media/Multimedia

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
27-4021	Photographers	\$18,010	\$28,864
27-1019	Artists and Related Workers, All Other	\$61,410	\$69,010
27-1024	Graphic Designers	\$25,140	\$45,084
27-1011	Art Directors	\$39,930	\$80,739
27-1014	Multimedia Artists and Animators	\$32,360	\$54,462

Environmental Education

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
28	13.1338	Environmental Education	0	0	2032.4	0	0.00%	3

Description of Major:

A program that prepares individuals to teach environmental education at various educational levels as a K-12 classroom educator. Includes instruction in foundations of environmental education, instructional methods, and related content knowledge.

Related Major: 31.0601, Outdoor Education

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	\$34,190	\$47,717
25-2021	Elementary School Teachers, Except Special Education	\$33,480	\$45,980
25-2022	Middle School Teachers, Except Special and Career/Technical Education	\$34,760	\$47,423

Logistics, Materials, and Supply Chain Management

Rank	CIPCode	CIPTitle	2013 ISU completions	2013 non-ISU state completions	combined target occupations state 2015-23 avg. annual openings (growth & replacement)	Indiana degree awards per combined target occupation openings	ISU % of total degree awards	number of related occupations
371	52.0203	Logistics, Materials, and Supply Chain Management	0	3	270.1	0.011107	0.00%	2

Description of Major:

A program that prepares individuals to manage and coordinate all logistical functions in an enterprise, ranging from acquisitions to receiving and handling, through internal allocation of resources to operations units, to the handling and delivery of output. Includes instruction in acquisitions and purchasing, inventory control, storage and handling, just-in-time manufacturing, logistics planning, shipping and delivery management, transportation, quality control, resource estimation and allocation, and budgeting.

Related Major: None listed.

Associated Careers:

SOC	Occupation Title	Average Initial Salary	Average Ten Year Out Salary
11-3071	Transportation, Storage, and Distribution Managers	\$47,720	\$57,666
11-3051	Industrial Production Managers	\$52,060	\$75,569