

## Postgraduate track Program: Urbanism and civil engineering

### 1. Olympiad winner's skill set

To win the international Open Doors Olympiad in this track you should have in-depth knowledge and skills in various areas, namely:

- mechanical systems, stresses, strains, forces and displacements of building structures and design solutions for structures, buildings and facilities.
- basics of construction technology, basic principles of organization and design of elements and systems of transportation complexes.
- basics of urban planning, social aspects of urban planning and modern trends in digitalization.

You should also have a solid command in the following skills:

- calculating stiffness, strength and stability of structural elements, buildings and structures (tension-compression, torsion, shear, bending, combined loading)
- be able to implement a simplified design scheme and analytical dependencies of element operation, design and quality control of construction materials.
- principles of urban area development and transportation infrastructure design.

### 2. List of degree programs covered by the subject area

#### 2.1. List of master's programs

- 07.04.02 Reconstruction and restoration of architectural heritage
- 07.04.03 Architectural environment design
- 07.04.04 Urban planning
- 08.04.01 Civil Engineering

#### 2.2. List of doctoral programs

- 2.1.1 Construction of buildings and facilities
- 2.1.2 Foundation and underground structures
- 2.1.3 Heat supply, ventilation, air conditioning, gas supply, and lighting
- 2.1.4 Water supply, sewerage, and water resources management
- 2.1.5 Civil engineering materials and products
- 2.1.6 Hydraulic engineering, hydraulics and engineering hydrology
- 2.1.13 Urban and rural settlement planning
- 2.1.14 Life cycle management of construction projects
- 2.1.7 Civil engineering technology and organization
- 2.1.8 Design and construction of roads, subways, airfields, bridges and transport tunnels
- 2.1.9 Structural mechanics
- 2.1.15 Construction site safety

### 3. Content

## **Design and construction of civil buildings**

### Strength of materials

1. Types of loading.
2. Stress. Normal stress. Shear stress.
3. Strain.
4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Resistability.
5. Tension and compression. Statically determinate and indeterminate systems.
6. State of stress.
7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.
8. Torsion. Torsion stress.
9. Bending. Shear force and bending moment diagrams. Flexural stresses.
10. Combined loading.

### Basics of designing structures, buildings, and facilities

1. Basis of building structural systems and their structural components;
2. Design basis for timber structures;
3. Design basis for steel structures;
4. Design basis for reinforced concrete structures;
5. Buckling of structural components.

### Urban planning

1. The history of the urban development spaces. The main schools and theories of urban studies.
2. Models of modern cities. Problems and trends in the development of the urban environment.
3. The social environment of the city.
4. Urban transport.
5. Green spaces in the urban environment.
6. Digitalization processes in modern urban planning.

## **Construction technology**

1. Construction technologies and methods.  
Monolithic construction.  
Panel and block construction.  
Modular and frame construction.
2. Methods and technologies for quality control in construction works.  
Non-destructive and destructive testing methods.  
Automation of quality control processes.
3. Organization of construction production and project management.  
Planning of construction production.  
Construction project management.  
Building information modeling (BIM).
4. Economic efficiency and optimization of construction projects.

- Cost reduction while maintaining quality.
- Optimization of construction process logistics.
- Risk management in construction.
- 5. Sustainable construction and environmental aspects.
  - Energy conservation and energy efficiency of buildings and structures.
  - Use of renewable energy sources.
  - Implementation of green building principles.

### **Transport system**

1. Transport network
2. Types of transport and their characteristics
3. Transport infrastructure
4. Public transport services
5. Logistics
6. Transport planning and modeling
7. Digital technologies in transportation
8. Intelligent transportation systems
9. Technosphere safety in transportation

### **Mechanics**

#### Structural mechanics

1. Statistically determinate and statically indeterminate rod systems.
2. Geometrically unstable and geometrically stable rod systems.
3. Structural analysis of statically determinate multispans hinged beams.
4. Structural analysis of statically determinate frames with closed boundary shape.
5. Structural analysis of statically determinate trusses.
6. Calculation of displacements in statically determinate frames and beams.
7. Calculation basis of statically indeterminate rod systems by force method.
8. Calculation basis of statically indeterminate rod systems by the displacement method.

#### Theory of elasticity

1. The Stress Tensor.
2. Principal Stresses, Principal Stress Directions.
3. Deviator and Spherical Stress States.
4. Hooke's Law for Isotropic Media.
5. Infinitesimal Deformation Theory.
6. Plane Elasticity.

### **Materials Science – assessment and testing**

1. Basics of building materials science. Structures of materials.
2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity.
3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity.
4. Cement. Composition. Properties.
5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties.

6. Concrete mix design. The design of the mix proportion of concrete.
7. Wall materials. Bricks. Blocks. Plates.
8. Steel. Steel for different applications. Testing. Mechanical properties.
9. Wood. Structures of wood. Testing. Mechanical properties.
10. Heat-insulating materials.

## 4. Recommended references

### 4.1. Reading list

#### Design and construction of civil buildings

Sources in English	Topic
<u>Strength of materials</u>	
<p>1. Beer F.P., Johnston E. R., DeWolf J.T., Mazurek D.F. Mechanics of Materials. McGraw Hill, 2019, 896 p.  <a href="https://www.amazon.com/Mechanics-Materials-Ferdinand-P-Beer/dp/1260113272">https://www.amazon.com/Mechanics-Materials-Ferdinand-P-Beer/dp/1260113272</a>            Limited access</p>	<ol style="list-style-type: none"> <li>1. Types of loading.</li> <li>2. Stress. Normal stress. Shear stress.</li> <li>3. Strain.</li> <li>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</li> <li>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</li> <li>6. State of stress.</li> <li>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</li> <li>8. Torsion. Torsion stress.</li> <li>9. Bending. Shear and moment diagram. The flexure formula.</li> <li>10. Combined loading.</li> </ol>
<p>2. Case J., Chilver L., ROSS C. Strength of Materials and Structures, Fourth Edition, Butterworth-Heinemann. 1999. 706 p.  <a href="https://www.sciencedirect.com/book/9780340719206/strength-of-materials-and-structures">https://www.sciencedirect.com/book/9780340719206/strength-of-materials-and-structures</a>            Limited access</p>	<ol style="list-style-type: none"> <li>1. Types of loading.</li> <li>2. Stress. Normal stress. Shear stress.</li> <li>3. Strain.</li> <li>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</li> <li>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</li> <li>6. State of stress.</li> <li>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</li> </ol>

	<p>8. Torsion. Torsion stress.</p> <p>9. Bending. Shear and moment diagram. The flexure formula.</p> <p>10. Combined loading..</p>
<p>3. Hibbeler R.C. Mechanics of Materials, 10th Global Edition. Pearson, 2018. 896 p.  <a href="https://www.pearson.com/se/Nordics-Higher-Education/subject-catalogue/engineering/mechanics-of-material-hibbeler.html">https://www.pearson.com/se/Nordics-Higher-Education/subject-catalogue/engineering/mechanics-of-material-hibbeler.html</a>          Limited access</p>	<p>1. Types of loading.</p> <p>2. Stress. Normal stress. Shear stress.</p> <p>3. Strain.</p> <p>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</p> <p>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</p> <p>6. State of stress.</p> <p>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</p> <p>8. Torsion. Torsion stress.</p> <p>9. Bending. Shear and moment diagram. The flexure formula.</p> <p>10. Combined loading.</p>
<p>4. Hučko B., Jančo R. Introduction to Mechanics of Materials: Part I, Bookboon, 2013, 160 p.  <a href="https://bookboon.com/en/introduction-to-mechanics-of-materials-part-i-ebook">https://bookboon.com/en/introduction-to-mechanics-of-materials-part-i-ebook</a>          Free access</p>	<p>1. Types of loading.</p> <p>2. Stress. Normal stress. Shear stress.</p> <p>3. Strain.</p> <p>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</p> <p>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</p> <p>6. State of stress.</p> <p>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</p> <p>8. Torsion. Torsion stress</p>
<p>5. Hučko B., Jančo R. Introduction to Mechanics of Materials: Part II, Bookboon, 2013, 234 p.  <a href="https://bookboon.com/en/introduction-to-mechanics-of-materials-part-ii-ebook">https://bookboon.com/en/introduction-to-mechanics-of-materials-part-ii-ebook</a>          Free access</p>	<p>9. Bending. Shear and moment diagram. The flexure formula.</p>
<p>6. Potter M.C. Schaum's Outline of Strength</p>	<p>1. Types of loading.</p>

<p>of Materials, 7th Edition, 2019, 304 p.  <a href="https://www.accessengineeringlibrary.com/content/book/9781260456547/">https://www.accessengineeringlibrary.com/content/book/9781260456547/</a>          Limited access</p>	<p>2. Stress. Normal stress. Shear stress.          3. Strain.          4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.          5. Tension and compression. Statically determinate and indeterminate axially loaded systems.          6. State of stress.          7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.          8. Torsion. Torsion stress.          9. Bending. Shear and moment diagram. The flexure formula.          10. Combined loading.</p>
<p><u>Basics of designing structures, buildings, and facilities</u></p>	
<p>1. Lingyu Zhou, Liping Wang, Liqiang Jiang. Design of Steel Structures. Materials, Connections, and Components 1st Edition - August 12, 2022.  <a href="https://shop.elsevier.com/books/design-of-steel-structures/zhou/978-0-323-91682-0">https://shop.elsevier.com/books/design-of-steel-structures/zhou/978-0-323-91682-0</a>          Limited access</p>	<p>1. Basis of building structural systems and their structural components          3. Design basis for steel structures          5. Buckling of structural components</p>
<p>2. Yining D., Xiliang N. Reinforced Concrete: Basic Theory and Standards. Press and Springer Nature Singapore Pte Ltd. 2023.  <a href="https://doi.org/10.1007/978-981-19-2920-5">https://doi.org/10.1007/978-981-19-2920-5</a>          Free access (for authorized users)</p>	<p>1. Basis of building structural systems and their structural components          4. Design basis for reinforced concrete structures</p>
<p>3. Swedish Wood, Design of Timber Structures, ISBN 978-91-985212-5-2  <a href="https://www.swedishwood.com/siteassets/5-publikationer/pdfer/sw-design-of-timber-structures-vol1-2022.pdf">https://www.swedishwood.com/siteassets/5-publikationer/pdfer/sw-design-of-timber-structures-vol1-2022.pdf</a>  <a href="https://www.swedishwood.com/siteassets/5-publikationer/pdfer/sw-design-of-timber-structures-vol2-2022.pdf">https://www.swedishwood.com/siteassets/5-publikationer/pdfer/sw-design-of-timber-structures-vol2-2022.pdf</a>  <a href="https://www.svensktra.se/siteassets/5-publikationer/pdfer/design-of-timber-structures-3-2016.pdf">https://www.svensktra.se/siteassets/5-publikationer/pdfer/design-of-timber-structures-3-2016.pdf</a>          Free access</p>	<p>1. Basis of building structural systems and their structural components          2. Design basis for timber structures</p>
<p><u>Urban planning</u></p>	

<p>1. Colin Ellard. Places of the Heart: The Psychogeography of Everyday Life. Kindle Edition. 257 p.  <a href="https://www.amazon.com/Places-Heart-Psychogeography-Everyday-Life-ebook/dp/B011H510K0">https://www.amazon.com/Places-Heart-Psychogeography-Everyday-Life-ebook/dp/B011H510K0</a>  <a href="https://books.google.ru/books?id=CeChDwAAQBAJ&amp;printsec=copyright&amp;redir_esc=y#v=onepage&amp;q&amp;f=false">https://books.google.ru/books?id=CeChDwAAQBAJ&amp;printsec=copyright&amp;redir_esc=y#v=onepage&amp;q&amp;f=false</a>  Limited access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment.  3. The social environment of the city.  5. Green spaces in the urban environment.</p>
<p>2. Encyclopedia of Urban Studies 1st Edition, Kindle Edition  <a href="https://www.amazon.com/Encyclopedia-Urban-Studies-Earl-Hutchison-ebook/dp/B00YFRCST0">https://www.amazon.com/Encyclopedia-Urban-Studies-Earl-Hutchison-ebook/dp/B00YFRCST0</a>  Limited access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment.  3. The social environment of the city.  4. Urban transport.</p>
<p>3. History of Urban Planning and Design. Cognella Academic Publishing. 2012. 358 p.  <a href="https://www.amazon.com/History-Planning-Design-Rabinowitz-Bussell/dp/1621310523">https://www.amazon.com/History-Planning-Design-Rabinowitz-Bussell/dp/1621310523</a>  Limited access</p>	<p>1. The history of the urban development spaces. The main schools and theories of urban studies.</p>
<p>4. Jan Gehl. Cities for people. ISLANDPRESS. Washington/Covelo/London, 2010  <a href="#">Cities For People - Jan Gehl.pdf</a>  (wikido.xyz)  Free access</p>	<p>1. The history of the urban development spaces. The main schools and theories of urban studies.  2. Models of modern cities. Problems and trends in the development of the urban environment.  3. The social environment of the city.  4. Urban transport.  5. Green spaces in the urban environment.  6. Digitalization processes in modern urban planning.</p>
<p>5. Rob Kitchin. The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences 1st Edition. SAGE Publications Ltd. 2014. 240 p.  <a href="https://se.moevm.info/lib/exe/fetch.php/courses:smart_data:the_data_revolution_big_data_open_data_data_infrastructures_and_their_consequences_by_rob_kitchin_z-lib.org.pdf">https://se.moevm.info/lib/exe/fetch.php/courses:smart_data:the_data_revolution_big_data_open_data_data_infrastructures_and_their_consequences_by_rob_kitchin_z-lib.org.pdf</a>  Free access</p>	<p>6. Digitalization processes in modern urban planning.</p>
<p>6. Sustainable Development Goals, section of the UN website  Home - United Nations Sustainable</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment.</p>

Development Free access	
7. Vukan Vuchic. Transportation for Livable Cities. Routledge; 1st edition. 378 p. <a href="https://www.amazon.com/Transportation-Livable-Cities-Vukan-Vuchic/dp/0882851616">https://www.amazon.com/Transportation-Livable-Cities-Vukan-Vuchic/dp/0882851616</a> <a href="https://www.perlego.com/book/1496843/transportation-for-livable-cities-pdf">https://www.perlego.com/book/1496843/transportation-for-livable-cities-pdf</a> Limited access	4. Urban transport.
8. William J Mitchell ME++ – The Cyborg Self and the Networked City. Massachusetts Institute of Technology. 2003 269 p. <a href="https://www.researchgate.net/publication/246788407_Me_The_Cyborg_Self_and_the_Networked_City">https://www.researchgate.net/publication/246788407_Me_The_Cyborg_Self_and_the_Networked_City</a> Free access	6. Digitalization processes in modern urban planning.

Sources in Russian	Topic
Strength of materials	
1. Миролюбов И.Н. и др. Сопротивление материалов: Пособие по решению задач. – 9-е изд., испр. – СПб.: Издательство «Лань», 2022. – 512 с. <a href="https://e.lanbook.com/book/211427">https://e.lanbook.com/book/211427</a> Free access (for authorized users)	1. Types of loading. 2. Stress. Normal stress. Shear stress. 3. Strain. 4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength. 5. Tension and compression. Statically determinate and indeterminate axially loaded systems. 6. State of stress. 7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia. 8. Torsion. Torsion stress. 9. Bending. Shear and moment diagram. The flexure formula. 10. Combined loading.
2. Павлов П.А., Паршин Л.К., Мельников Б.Е., Шерстнев В.А. Сборник задач по сопротивлению материалов: учебное пособие, 5-е изд. Санкт-Петербург: Лань, 2022. 432 с. <a href="https://e.lanbook.com/book/209822">https://e.lanbook.com/book/209822</a> Limited access	1. Types of loading. 2. Stress. Normal stress. Shear stress. 3. Strain. 4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.

	<p>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</p> <p>6. State of stress.</p> <p>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</p> <p>8. Torsion. Torsion stress.</p> <p>9. Bending. Shear and moment diagram. The flexure formula.</p> <p>10. Combined loading.</p>
<p>3. Павлов П.А., Паршин Л.К., Мельников Б.Е., Шерстнев В.А. Сопротивление материалов: учебник. 5-е изд. Санкт-Петербург: Лань, 2022. 556 с. <a href="https://e.lanbook.com/book/206420">https://e.lanbook.com/book/206420</a> Limited access</p>	<p>1. Types of loading.</p> <p>2. Stress. Normal stress. Shear stress.</p> <p>3. Strain.</p> <p>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</p> <p>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</p> <p>6. State of stress.</p> <p>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</p> <p>8. Torsion. Torsion stress.</p> <p>9. Bending. Shear and moment diagram. The flexure formula.</p> <p>10. Combined loading.</p>
<p>4. Феодосьев В.И. Сопротивление материалов: Учебник для студ-ов высш.техн.учеб.зав. 10-е изд. М.: Изд-во МГТУ им. Н.Э. Баумана, 1999. – 592 с. <a href="https://pnu.edu.ru/media/filer_public/2013/04/10/2-12_fedosev_sopromat_1999.pdf">https://pnu.edu.ru/media/filer_public/2013/04/10/2-12_fedosev_sopromat_1999.pdf</a> Free access</p>	<p>1. Types of loading.</p> <p>2. Stress. Normal stress. Shear stress.</p> <p>3. Strain.</p> <p>4. Mechanical properties of materials. The stress-strain diagram. Stress-strain behavior of structural material. Hooke's law. Modulus of elasticity. Strength.</p> <p>5. Tension and compression. Statically determinate and indeterminate axially loaded systems.</p> <p>6. State of stress.</p> <p>7. Geometric properties of an area. Center of gravity. Moment of inertia for an area. Polar moment of inertia.</p> <p>8. Torsion. Torsion stress.</p>

	9. Bending. Shear and moment diagram. The flexure formula. 10. Combined loading.
<u>Basics of designing structures, buildings, and facilities</u>	
1. Габрусенко В. В. Основы расчета железобетона в вопросах и ответах : учеб. пособие В.В. Габрусенко; - 3-е изд., переработанное и дополненное. - М: Издательство АСВ, 20 14. - 160 с. <a href="https://vk.com/doc2104159_442884264">https://vk.com/doc2104159_442884264</a> Free access	1. Basis of building structural systems and their structural components. 4. Design basis for reinforced concrete structures.
2. Конструкции из дерева и пластмасс: Учеб.-метод. комплекс для студ. спец.1-70 02 01 «Промышленное и гражданское строительство» / Сост. и общ. ред. А.Р. Волик. – Новополюцк: ПГУ, 2005. – 300 с. ISBN 985-418-320-3 <a href="https://core.ac.uk/download/pdf/128495686.pdf">https://core.ac.uk/download/pdf/128495686.pdf</a> Free access	1. Basis of building structural systems and their structural components 2. Design basis for timber structures.
3. Проектирование металлических конструкций. Часть 1: «Металлические конструкции. Материалы и основы проектирования». Учебник для ВУЗов / С. М. Тихонов, В. Н. Алехин, З. В. Беляева и др.; под общей. ред. А. Р. Туснина — М.: Издательство «Перо», 2020 — 468 с., ил.  Проектирование металлических конструкций. Часть 2: «Металлические конструкции. Специальный курс». Учебник для ВУЗов / А. Р. Туснин, В. А. Рыбаков, Т. В. Назмеева и др.; под общей. ред. А. Р. Туснина — М.: Издательство «Перо», 2020 — 436 с., ил. <a href="https://steel-development.ru/ru/for-students/text-books">https://steel-development.ru/ru/for-students/text-books</a> Free access	1. Basis of building structural systems and their structural components. 3. Design basis for steel structures. 5. Buckling of structural components.
<u>Urban planning</u>	
1. Гейл Ян. Города для людей. Изд. на русском языке – Концерн «КРОСТ», пер.с англ. – М.: Альпина Паблицер, 2012. – 276 с.	1. The history of the urban development spaces. The main schools and theories of urban studies 2. Models of modern cities. Problems and

<p>Скачать книгу: Города для людей. Ян Гейл. 2012   Библиотека: книги по архитектуре и строительству   Totalarch Free access</p>	<p>trends in the development of the urban environment 3. The social environment of the city 4. Urban transport 5. Green spaces in the urban environment 6. Digitalization processes in modern urban planning</p>
<p>2. Глазычев В.Л. Урбанистика 1-е изд., стер. - Москва: Европа: КДУ, 2008. 326 с. <a href="http://kyiv-landuse.com/sites/default/files/%D0%93%D0%9B%D0%90%D0%97%D0%AB%D0%A7%D0%95%D0%92%20-%20%D0%A3%D1%80%D0%B1%D0%B0%D0%BD%D0%B8%D1%81%D1%82%D0%B8%D0%BA%D0%B0%202008%20%D1%82%D0%BE%D0%BC%201-3.pdf">http://kyiv-landuse.com/sites/default/files/%D0%93%D0%9B%D0%90%D0%97%D0%AB%D0%A7%D0%95%D0%92%20-%20%D0%A3%D1%80%D0%B1%D0%B0%D0%BD%D0%B8%D1%81%D1%82%D0%B8%D0%BA%D0%B0%202008%20%D1%82%D0%BE%D0%BC%201-3.pdf</a> Free access</p>	<p>1. The history of the urban development spaces. The main schools and theories of urban studies 2. Models of modern cities. Problems and trends in the development of the urban environment</p>
<p>3. Микроурбанизм. Город в деталях / Сб. статей; под отв. редакцией О. Бредниковой, О. Запорожец. М.: Новое литературное обозрение, 2014. 352 с.: ил. (Серия studia urbanica) <a href="https://www.hse.ru/data/2015/03/21/1323410336/%D0%9C%D0%B8%D0%BA%D1%80%D0%BE%D1%83%D1%80%D0%B1%D0%B0%D0%BD%D0%B8%D0%B7%D0%BC.pdf">https://www.hse.ru/data/2015/03/21/1323410336/%D0%9C%D0%B8%D0%BA%D1%80%D0%BE%D1%83%D1%80%D0%B1%D0%B0%D0%BD%D0%B8%D0%B7%D0%BC.pdf</a> Free access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment 3. The social environment of the city</p>
<p>4. Митягин С.Д. Территориальное планирование, градостроительное зонирование и планировка территории: учебное пособие / С. Д. Митягин. — Санкт-Петербург: Лань, 2022. — 200 с. — ISBN 978-5-8114-4050-4. — Текст: электронный // Лань: электронно-библиотечная система. <a href="https://e.lanbook.com/book/215756">https://e.lanbook.com/book/215756</a> Free access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment</p>
<p>5. Основы градостроительства: Учебное пособие / Г.А. Малоян. — Москва: Издательство Ассоциации строительных вузов, 2004. — 120 с., ил. — ISBN 5-93093-283-2</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment 4. Urban transport 5. Green spaces in the urban environment</p>

<p><a href="https://tehne.com/node/4183">https://tehne.com/node/4183</a> Free access</p>	
<p>6. Перькова М.В. Пространственное развитие белгородской региональной системы расселения и ее элементов. БГТУ им. В.Г. Шухова, 2016. 250 с. <a href="https://elibrary.ru/download/elibrary_44192937_17102334.pdf">https://elibrary.ru/download/elibrary_44192937_17102334.pdf</a>. Limited access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment 4. Urban transport 5. Green spaces in the urban environment</p>
<p>7. Попов Е.В. Умные города: монография. Москва: Издательство Юрайт, 2023. 346 с. ISBN 978-5-534-13732-3. — Текст: электронный // Образовательная платформа Юрайт [сайт]. <a href="https://urait.ru/book/umnye-goroda-543989">https://urait.ru/book/umnye-goroda-543989</a> <u>УМНЫЕ ГОРОДА. Монография (urait.ru)</u> Limited access/ Free access</p>	<p>6. Digitalization processes in modern urban planning</p>
<p>8. Рой О.М. Основы градостроительства и территориального планирования: учебник и практикум для вузов / О. М. Рой. — 2-е изд., испр. и доп. — Москва: Издательство Юрайт, 2019. — 249 с. — (Высшее образование). — Текст : непосредственный. ISBN 978-5-534-11611-3 <u>Попов Е. В., Семячков К. А. Умные города — купить, читать онлайн. «Юрайт» (urait.ru)</u> <a href="https://urait.ru/bcode/519740">https://urait.ru/bcode/519740</a> Free access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment</p>
<p>9. «Цели в области устойчивого развития», раздел сайта ООН <u>Первая страница — Устойчивое развитие (un.org)</u> Free access</p>	<p>2. Models of modern cities. Problems and trends in the development of the urban environment</p>

### Construction technology

Sources in English	Topic
<p>1. ABE KRUGER, CARL SEVILLE «GREEN BUILDING: PRINCIPLES AND PRACTICES IN RESIDENTIAL CONSTRUCTION (GO GREEN WITH RENEWABLE ENERGY RESOURCES),</p>	<p>5. Sustainable construction and environmental aspects Energy saving and energy efficiency of buildings and structures Use of renewable energy sources</p>

<p>2012, 608P.  <a href="https://www.amazon.com/Green-Building-Principles-Practices-Residential/dp/1111135959">https://www.amazon.com/Green-Building-Principles-Practices-Residential/dp/1111135959</a>          Limited access</p>	<p>Implementation of green building principles</p>
<p>2. Adrienne Watt "Project Management – 2nd Edition", 2014, 200p.  <a href="https://opentextbc.ca/projectmanagement/">https://opentextbc.ca/projectmanagement/</a>          Limited access</p>	<p>3. Organization of construction production and project management          Planning of construction production          Construction project management          Building information modeling (BIM)</p>
<p>3. Alan Griffith and Paul Watson «Construction Management: Principles and Practice», 2004, 508p.  <a href="https://link.springer.com/book/10.1007/978-0-230-50021-1">https://link.springer.com/book/10.1007/978-0-230-50021-1</a>          Limited access</p>	<p>3. Organization of construction production and project management          Planning of construction production          Construction project management          Building information modeling (BIM)</p>
<p>4. Amitava Mitra «Fundamentals of Quality Control and Improvement», 2008, 700p.  <a href="https://onlinelibrary.wiley.com/doi/book/10.1002/9781118491645">https://onlinelibrary.wiley.com/doi/book/10.1002/9781118491645</a>          Limited access</p>	<p>2. Methods and technologies for quality control in construction works          Non-destructive and destructive testing methods          Automation of quality control processes</p>
<p>5. Donald Towey «Cost Management of Construction Projects», 2013, 336 p.  <a href="https://www.amazon.com/Management-Construction-Projects-Donald-Towey/dp/1118473779">https://www.amazon.com/Management-Construction-Projects-Donald-Towey/dp/1118473779</a>          Limited access</p>	<p>4. Building information modeling (BIM)          Economic efficiency and optimization of construction projects          Cost reduction while maintaining quality          Optimization of construction process logistics          Risk management in construction</p>
<p>6. E. Keith Blankenbaker «Construction and Building Technology», 2013, 608p.  <a href="https://www.g-w.com/construction-building-technology-2013">https://www.g-w.com/construction-building-technology-2013</a>          Limited access</p>	<p>1. Construction technologies and methods          Monolithic construction          Panel and block construction          Modular and frame construction</p>
<p>7. How to Enhance Quality Control in Construction Management, 2024  <a href="https://www.constructionplacements.com/enhancing-quality-control-construction-management/">https://www.constructionplacements.com/enhancing-quality-control-construction-management/</a>          Free access</p>	<p>2. Methods and technologies for quality control in construction works          Non-destructive and destructive testing methods          Automation of quality control processes</p>
<p>8. James J. O'Brien "Construction Inspection Handbook: Quality Assurance/Quality Control", 1989, 773p.  <a href="https://link.springer.com/book/10.1007/978-1-4757-1191-2?page=2#toc">https://link.springer.com/book/10.1007/978-1-4757-1191-2?page=2#toc</a>          Limited access</p>	<p>2. Methods and technologies for quality control in construction works          Non-destructive and destructive testing methods          Automation of quality control processes</p>

<p>9. Joseph Iano, Edward «Allen Fundamentals of Building Construction: Materials and Methods, 7th Edition», 2019, 944p.  <a href="https://www.wiley.com/en-us/Fundamentals+of+Building+Construction%3A+Materials+and+Methods%2C+7th+Edition-p-9781119446194">https://www.wiley.com/en-us/Fundamentals+of+Building+Construction%3A+Materials+and+Methods%2C+7th+Edition-p-9781119446194</a>          Limited access</p>	<p>1. Construction technologies and methods          Monolithic construction          Panel and block construction          Modular and frame construction</p>
<p>10. J Zhou, X Wang, K L Teo &amp; Z Irani A review of methods and algorithms for optimizing construction scheduling, 2013, Volume 64, pages 1091–1105  <a href="https://link.springer.com/article/10.1057/jors.2012.174">https://link.springer.com/article/10.1057/jors.2012.174</a>          Limited access</p>	<p>4. Building information modeling (BIM)          Economic efficiency and optimization of construction projects          Cost reduction while maintaining quality          Optimization of construction process logistics          Risk management in construction</p>
<p>11. Madan L. Mehta, Walter Scarborough, and Diane Armpriest « Building Construction: Principles, Materials, and Systems, 3rd edition», 2018, 300p.  <a href="https://www.pearson.com/en-us/subject-catalog/p/building-construction-principles-materials-and-systems/P200000001496/9780137402793">https://www.pearson.com/en-us/subject-catalog/p/building-construction-principles-materials-and-systems/P200000001496/9780137402793</a>          Limited access</p>	<p>1. Construction technologies and methods          Monolithic construction          Panel and block construction          Modular and frame construction</p>
<p>12. Mehrdad Ghahramani, Daryoush Habibi, Mehran Ghahramani, Morteza Nazari-Heris &amp; Asma Aziz «Sustainable Buildings: A Comprehensive Review and Classification of Challenges and Issues, Benefits, and Future Directions», 2023, 28 p.  <a href="https://link.springer.com/chapter/10.1007/978-3-031-41148-9_1">https://link.springer.com/chapter/10.1007/978-3-031-41148-9_1</a>          Limited access</p>	<p>5. Sustainable construction and environmental aspects          Energy saving and energy efficiency of buildings and structures          Use of renewable energy sources          Implementation of green building principles</p>
<p>13. Routledge «Introduction to Construction Management», 2022, 138 p.  <a href="https://www.routledge.com/rsc/downloads/An_Introduction_to_Construction_Management.pdf#:~:text=URL%3A%20https%3A%2F%2Fwww.routledge.com%2Frsc%2Fdownloads%2FAn_Introduction_to_Construction_Management.pdf%0AVisible%3A%200%25%20">https://www.routledge.com/rsc/downloads/An_Introduction_to_Construction_Management.pdf#:~:text=URL%3A%20https%3A%2F%2Fwww.routledge.com%2Frsc%2Fdownloads%2FAn_Introduction_to_Construction_Management.pdf%0AVisible%3A%200%25%20</a>          Free access</p>	<p>3. Organization of construction production and project management          Planning of construction production          Construction project management          Building information modeling (BIM)</p>
<p>14. Xiaoming Wang, Sayanthan Ramakrishnan "Environmental Sustainability</p>	<p>5. Sustainable construction and environmental aspects</p>

in Building Design and Construction", 2021, 175 p. <a href="https://link.springer.com/book/10.1007/978-3-030-76231-5">https://link.springer.com/book/10.1007/978-3-030-76231-5</a> Limited access	Energy saving and energy efficiency of buildings and structures Use of renewable energy sources Implementation of green building principles
---	---

Sources in Russian	Topic
1. Абрамян, С.Г. Организация, планирование и управление строительством : учебник / С. Г. Абрамян, О. В. Бурлаченко, Т. Ф. Чередниченко. — Волгоград : ВолгГТУ, 2019. — 340 с. — ISBN 978-5-9948-3437-4. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/288566">https://e.lanbook.com/book/288566</a> Free access (for authorized users)	3. Organization of construction production and project management Planning of construction production Construction project management Building information modeling (BIM)
2. Асанов, В. Л. Управление архитектурно-строительными проектами в современных условиях : монография / В. Л. Асанов. — 3-е изд., стер. — Санкт-Петербург : Лань, 2022. — 240 с. — ISBN 978-5-507-44916-3. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/249839">https://e.lanbook.com/book/249839</a> Free access (for authorized users)	3. Organization of construction production and project management Planning of construction production Construction project management Building information modeling (BIM)
3. Гилязидинова, Н. В. Технология возведения зданий и сооружений : учебное пособие / Н. В. Гилязидинова, Т. Н. Санталова, Н. Ю. Рудковская. — Кемерово : КузГТУ имени Т.Ф. Горбачева, 2023. — 280 с. — ISBN 978-5-00137-448-0. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/399737">https://e.lanbook.com/book/399737</a> Free access (for authorized users)	1. Construction technologies and methods Monolithic construction Panel and block construction Modular and frame construction
4. Керро, Н. И. Экологическая безопасность в строительстве: практические аспекты обеспечения устойчивого развития : учебно-методическое пособие / Н. И. Керро. — Вологда : Инфра-Инженерия, 2019. — 244 с. — ISBN 978-5-9729-0258-3. — Текст : электронный // Лань : электронно-	5. Sustainable construction and environmental aspects. Energy saving and energy efficiency of buildings and structures. Use of renewable energy sources.

библиотечная система. <a href="https://e.lanbook.com/book/124606">https://e.lanbook.com/book/124606</a> Free access (for authorized users)	
5. Мишланова, М. Ю. Управление стоимостью инвестиционно-строительных проектов : монография / М. Ю. Мишланова. — Москва : МИСИ – МГСУ, 2020. — 128 с. — ISBN 978-5-7264-2818-5. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/165176">https://e.lanbook.com/book/165176</a> Free access (for authorized users)	4. Building information modeling (BIM) Economic efficiency and optimization of construction projects Cost reduction while maintaining quality Optimization of construction process logistics Risk management in construction
6. Организация контроля качества строительно-монтажных работ : учебно-методическое пособие / составитель В. Н. Шишканова. — Тольятти : ТГУ, 2010. — 32 с. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/139944">https://e.lanbook.com/book/139944</a> Free access (for authorized users)	2. Methods and technologies for quality control in construction works Non-destructive and destructive testing methods Automation of quality control processes
7. Пинчук, Т. О. Логистика в строительстве : учебное пособие / Т. О. Пинчук. — Иркутск: ИРНИТУ, 2018. — 100 с. — ISBN 978-5-8038-1257-9. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/217226">https://e.lanbook.com/book/217226</a> Free access (for authorized users)	4. Building information modeling (BIM) Economic efficiency and optimization of construction projects Cost reduction while maintaining quality Optimization of construction process logistics Risk management in construction
8. Строительные композиты для «зеленых» технологий: анализ состояния и перспективы : монография / М. А. Гончарова, А. Г. Заева, Е. С. Дергунова, И. И. Моисеева. — Липецк : Липецкий ГТУ, 2023. — 174 с. — ISBN 978-5-94947-258-3. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/411254">https://e.lanbook.com/book/411254</a> Free access (for authorized users)	5. Sustainable construction and environmental aspects. Energy saving and energy efficiency of buildings and structures. Use of renewable energy sources.
9. Строительный контроль в промышленном и гражданском строительстве : учебное пособие / А. А. Лapidус, А. Н. Макаров, Д. Д. Коротеев, Болотова. — Москва : МИСИ – МГСУ, 2023. — 64 с. — ISBN 978-5-7264-3260-	2. Methods and technologies for quality control in construction works Non-destructive and destructive testing methods Automation of quality control processes

<p>1. — Текст : электронный // Лань : электронно-библиотечная система.  <a href="https://e.lanbook.com/book/369824">https://e.lanbook.com/book/369824</a>  Free access (for authorized users)</p>	
<p>10. Талапов, В. В. Технология BIM: суть и особенности внедрения информационного моделирования зданий : учебное пособие / В. В. Талапов. — Москва : ДМК Пресс, 2015. — 410 с. — ISBN 978-5-97060-291-1. — Текст : электронный // Лань : электронно-библиотечная система.  <a href="https://e.lanbook.com/book/93274">https://e.lanbook.com/book/93274</a>  Free access (for authorized users)</p>	<p>3. Organization of construction production and project management  Planning of construction production  Construction project management  Building information modeling (BIM)</p>
<p>11. Технология возведения зданий и сооружений : учебно-методическое пособие / Е. М. Пугач, В. Е. Базанов, С. И. Экба, П. А. Говоруха. — Москва : МИСИ – МГСУ, 2022. — 50 с. — ISBN 978-5-7264-3057-7. — Текст : электронный // Лань : электронно-библиотечная система  <a href="https://e.lanbook.com/book/342602">https://e.lanbook.com/book/342602</a>  Free access (for authorized users)</p>	<p>1. Construction technologies and methods  Monolithic construction  Panel and block construction  Modular and frame construction</p>
<p>12. Толкачев, В. И. Архитектурное проектирование многоэтажных жилых зданий : учебное пособие / В. И. Толкачев, Г. У. Козачун. — Омск : СибАДИ, 2024. — 155 с. — Текст : электронный // Лань : электронно-библиотечная система. —  <a href="https://e.lanbook.com/book/407387">https://e.lanbook.com/book/407387</a>  Free access (for authorized users)</p>	<p>1. Construction technologies and methods  Monolithic construction  Panel and block construction  Modular and frame construction</p>
<p>13. Удалов, С. Н. Возобновляемая энергетика : учебное пособие / С. Н. Удалов. — Новосибирск : НГТУ, 2016. — 607 с. — ISBN 978-5-7782-2915-0. — Текст : электронный // Лань : электронно-библиотечная система.  <a href="https://e.lanbook.com/book/118065">https://e.lanbook.com/book/118065</a>  Free access (for authorized users)</p>	<p>5. Sustainable construction and environmental aspects.  Energy saving and energy efficiency of buildings and structures.  Use of renewable energy sources.</p>
<p>14. Управление риском и конструкционная безопасность строительных объектов : учебное пособие / А. П. Мельчаков, Д. А. Байбурин, Е. В. Шукутина, А. Х. Байбурин. — Санкт-Петербург : Лань, 2022. — 172 с. — ISBN 978-5-8114-3847-</p>	<p>4. Building information modeling (BIM)  Economic efficiency and optimization of construction projects  Cost reduction while maintaining quality  Optimization of construction process logistics  Risk management in construction</p>

1. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/206954">https://e.lanbook.com/book/206954</a> Free access (for authorized users)	
15. Шалыгин, М. Г. Автоматизация измерений, контроля и испытаний / М. Г. Шалыгин, Я. А. Вавилин. — 3-е изд., стер. — Санкт-Петербург : Лань, 2024. — 172 с. — ISBN 978-5-507-47370-0. — Текст : электронный // Лань : электронно-библиотечная система. <a href="https://e.lanbook.com/book/364529">https://e.lanbook.com/book/364529</a> Free access (for authorized users)	2. Methods and technologies for quality control in construction works Non-destructive and destructive testing methods Automation of quality control processes

### Transport system

Sources in English	Topic
1. Rodrigue J. The geography of transport systems / J. Rodrigue, C. Comtois, B. Slack. – London : Routledge, 2006. <a href="https://transportgeography.org/download/geography-of-transport-systems-3rd-edition/">https://transportgeography.org/download/geography-of-transport-systems-3rd-edition/</a> Free access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation 8. Intelligent transportation systems 9. Technosphere safety in transportation
2. Public Transport. Its Planning, Management and Operation. By Peter R. White. 5th Edition. First Published. 2008. London. – P.240. ISBN 9780203892282. DOI: <a href="https://doi.org/10.4324/9780203892282">https://doi.org/10.4324/9780203892282</a> <a href="https://www.taylorfrancis.com/books/mono/10.4324/9780203892282/public-transport-peter-white?context=ubx&amp;refId=62b699c1-d77a-4966-b132-3f946baff5e">https://www.taylorfrancis.com/books/mono/10.4324/9780203892282/public-transport-peter-white?context=ubx&amp;refId=62b699c1-d77a-4966-b132-3f946baff5e</a> Limited access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation 8. Intelligent transportation systems 9. Technosphere safety in transportation
3. Transportation Planning Handbook. ITE (Institute of Transportation Engineers), Michael D. Meyer. John Wiley & Sons, 2016. –1200 p. <a href="https://books.google.ru/books?id=MKipDAAAQBAJ&amp;hl=ru">https://books.google.ru/books?id=MKipDAAAQBAJ&amp;hl=ru</a> Limited access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation

	8. Intelligent transportation systems 9. Technosphere safety in transportation
4. Transport Infrastructure and Systems. Proceedings of the AIT International Congress on Transport Infrastructure and Systems. Edited By Gianluca Dell'Acqua, Fred Wegman. 1st Edition First. 2017. London. – P.1154. ISBN 9781315281896. DOI: <a href="https://doi.org/10.1201/9781315281896">https://doi.org/10.1201/9781315281896</a> <a href="https://www.taylorfrancis.com/books/edit/10.1201/9781315281896/transport-infrastructure-systems-gianluca-dell-acqua-fred-wegman">https://www.taylorfrancis.com/books/edit/10.1201/9781315281896/transport-infrastructure-systems-gianluca-dell-acqua-fred-wegman</a> Limited access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation 8. Intelligent transportation systems 9. Technosphere safety in transportation
5. Vukan Vuchic. Transportation for Livable Cities. Routledge; 1st edition. 378 p. <a href="https://www.amazon.com/Transportation-Livable-Cities-Vukan-Vuchic/dp/0882851616">https://www.amazon.com/Transportation-Livable-Cities-Vukan-Vuchic/dp/0882851616</a> Free access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation 8. Intelligent transportation systems 9. Technosphere safety in transportation

Sources in Russian	Topic
1. Вучик, Вукан. Транспорт в городах, удобных для жизни: практическое пособие / В. Р. Вучик, А. Калинин. – Москва: Издательский дом "Территория будущего", 2011. – 576 с. – ISBN 978-5-91129-058-0 <a href="https://fictionbook.ru">Транспорт в городах, удобных для жизни (fictionbook.ru)</a> Free access	1. Transport network 2. Types of transport and their characteristics 3. Transport infrastructure 4. Public transport services 5. Logistics 6. Transport planning and modeling 7. Digital technologies in transportation 8. Intelligent transportation systems 9. Technosphere safety in transportation
2. Горев, А.Э. Информационные технологии на транспорте: учебник для вузов / А. Э. Горев. — 3-е изд., перераб. и доп. — Москва: Издательство Юрайт, 2023. — 314 с. — (Высшее образование). — ISBN 978-5-534-17349-9. <a href="https://urait.ru/bcode/532916">https://urait.ru/bcode/532916</a> Limited access	7. Digital technologies in transportation

Sources in Russian	Topic
<p>3. Евстигнеев, И.А. Интеллектуальные транспортные системы на автомобильных дорогах федерального значения России. — М.: Изд-во «Перо», 2015. — 164 с. ISBN 978-5-00086-854-6</p> <p><a href="https://www.evstigneevigor.ru/%D0%9A%D0%BD%D0%B8%D0%B3%D0%B0_%D0%98%D0%A2%D0%A1_1.pdf">https://www.evstigneevigor.ru/%D0%9A%D0%BD%D0%B8%D0%B3%D0%B0_%D0%98%D0%A2%D0%A1_1.pdf</a></p> <p>Free access</p>	<p>7. Digital technologies in transportation</p> <p>8. Intelligent transportation systems</p>
<p>4. Евстигнеев И.А. Основы создания интеллектуальных транспортных систем в городских агломерациях России. – М. : Издательство «Перо», 2021. – 294 с</p> <p><a href="https://www.evstigneevigor.ru/%D0%9A%D0%BD%D0%B8%D0%B3%D0%B0_%D0%98%D0%A2%D0%A1_2.pdf">https://www.evstigneevigor.ru/%D0%9A%D0%BD%D0%B8%D0%B3%D0%B0_%D0%98%D0%A2%D0%A1_2.pdf</a></p> <p>Free access</p>	<p>7. Digital technologies in transportation</p> <p>8. Intelligent transportation systems</p>
<p>5. Единая транспортная система. Учебное пособие для среднего профессионального образования// Н.А. Троицкая, А.Б. Чубуков. – Москва. : Академия, 2017. – 288 с.</p> <p><a href="https://obuchalka.org/20220301141710/edina-ya-transportnaya-sistema-uchebnik-troickaya-n-a-2007.html?ysclid=ixtbrw08lq43418260">https://obuchalka.org/20220301141710/edina-ya-transportnaya-sistema-uchebnik-troickaya-n-a-2007.html?ysclid=ixtbrw08lq43418260</a></p> <p>Free access</p>	<p>1. Transport network</p> <p>2. Types of transport and their characteristics</p> <p>3. Transport infrastructure</p> <p>4. Public transport services</p> <p>5. Logistics</p> <p>6. Transport planning and modeling</p> <p>7. Digital technologies in transportation</p> <p>8. Intelligent transportation systems</p> <p>9. Technosphere safety in transport</p>
<p>6. Солодкий, А. И. Транспортная инфраструктура: учебник и практикум для среднего профессионального образования / А. И. Солодкий, А. Э. Горев, Э. Д. З. Бондарева. — 2-е изд., испр. и доп. — Москва. : Издательство Юрайт, 2023. — 326 с. — (Профессиональное образование). — ISBN 978-5-534-15919-6</p> <p><a href="https://urait.ru/bcode/510271">https://urait.ru/bcode/510271</a></p> <p>Limited access</p>	<p>1. Transport network</p> <p>2. Types of transport and their characteristics</p> <p>3. Transport infrastructure</p>
<p>7. Якимов М.Р. Транспортное планирование: создание транспортных моделей городов: монография / М.Р. Якимов. – М. : Логос, 2013. – 188 с.</p> <p><a href="http://simulation.su/uploads/files/default/2013-yakimova-monography-1.pdf">http://simulation.su/uploads/files/default/2013-yakimova-monography-1.pdf</a></p> <p>Free access</p>	<p>1. Transport network</p> <p>2. Types of transport and their characteristics</p> <p>3. Transport infrastructure</p> <p>4. Public transport services</p> <p>5. Logistics</p> <p>6. Transport planning and modeling</p> <p>7. Digital technologies in transportation</p>

Sources in Russian	Topic
	8. Intelligent transportation systems 9. Technosphere safety in transport

### Mechanics

Sources in English	Corresponding topic
<u>Structural mechanics</u>	
<p>1. Ghali A., Neville A.M. Structural Analysis. A Unified Classical and Matrix Approach (7th edition): Taylor &amp; Francis Group, 2017. 934 p. <a href="https://www.taylorfrancis.com/books/mono/10.1201/b22004/structural-analysis-amin-ghali-neville-brown">https://www.taylorfrancis.com/books/mono/10.1201/b22004/structural-analysis-amin-ghali-neville-brown</a> Limited access</p>	<p>1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.</p>
<p>2. Karnovsky I.A., Lebed O. Advanced methods of Structural Analysis. Strength, Stability, Vibration. Second Edition: Springer, 2021. 795 p. <a href="https://books.google.ru/books?id=b1YkEAA_AQBAJ&amp;printsec=frontcover&amp;hl=ru#v=onepage&amp;q&amp;f=false">https://books.google.ru/books?id=b1YkEAA_AQBAJ&amp;printsec=frontcover&amp;hl=ru#v=onepage&amp;q&amp;f=false</a> Limited access</p>	<p>1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.</p>
<p>3. Leet K.M., Uang C.M., Gilbert A.M. Fundamentals of Structural Analysis: McGraw-Hill (fifth Version), McGraw-Hill Education, 2018. 801 p. <a href="https://freepdfbook.com/fundamentals-of-">https://freepdfbook.com/fundamentals-of-</a></p>	<p>1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate</p>

<p><a href="#">structural-analysis-pdf-free/</a> Free access</p>	<p>multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.</p>
<p>4. Pataik S.N., Hopkins D.A. Strength of Materials. A Unified Theory: Elsevier, 2004. 750 p., <a href="http://nzdr.ru/data/media/biblio/kolxoz/E/EM/Patnaik%20S.N.,%20Hopkins%20D.A.%20Strength%20of%20Materials..%20A%20Unified%20Theory%20(Elsevier,%202004)(ISBN%200750674024)(774s)_EM_.pdf">http://nzdr.ru/data/media/biblio/kolxoz/E/EM/Patnaik%20S.N.,%20Hopkins%20D.A.%20Strength%20of%20Materials..%20A%20Unified%20Theory%20(Elsevier,%202004)(ISBN%200750674024)(774s)_EM_.pdf</a> Free access</p>	<p>1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.</p>
<u>Theory of elasticity</u>	
<p>1. BARBER J.R.. Elasticity <a href="https://www.usb.ac.ir/FileStaff/8649_2020-2-1-10-4-0.pdf">https://www.usb.ac.ir/FileStaff/8649_2020-2-1-10-4-0.pdf</a> Free access</p>	<p>1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.</p>
<p>2. Christian Wieners Foundation of Mathematical Elasticity <a href="https://www.math.kit.edu/ianm3/lehre/kontmech2017w/media/gdk_skript_alt.pdf">https://www.math.kit.edu/ianm3/lehre/kontmech2017w/media/gdk_skript_alt.pdf</a> Free access</p>	<p>1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory.</p>
<p>3. Davis R.O., Selvadurai A.P. Elasticity and geomechanics <a href="https://www.geokniga.org/books/33246">https://www.geokniga.org/books/33246</a></p>	<p>1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions.</p>

Free access	3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.
4. Lawrence E. Malvern Introduction to the mechanics of a continuous medium <a href="https://www.ipgp.fr/~kaminski/web_doudoud/Malvern_book.pdf">https://www.ipgp.fr/~kaminski/web_doudoud/Malvern_book.pdf</a> Free access	1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.

Sources in Russian	Corresponding topic
<u>Structural mechanics</u>	
1. Баженов В.А., Перельмутер А.В., Шишов О.В. Строительная механика. Компьютерные технологии и моделирование. К.: ПАТ «ВИПОЛ», 2014. 912с. <a href="https://www.livelib.ru/book/1001320566-stroitel'naya-mehnika-kompyuternye-tehnologii-i-modelirovanie-uchebnik-anatolij-perelmuter">https://www.livelib.ru/book/1001320566-stroitel'naya-mehnika-kompyuternye-tehnologii-i-modelirovanie-uchebnik-anatolij-perelmuter</a> Limited access	1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.
2. Дарков А.В., Шапошников Н.Н. Строительная механика. СПб: Издательство «Лань», 2010. 656 с. <a href="https://e.lanbook.com/book/212861">https://e.lanbook.com/book/212861</a> Free access (for authorized users)	1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method.

Sources in Russian	Corresponding topic
	8. Calculation basis of statically indeterminate rod systems by the displacement method.
3. Ржаницын А.Р. Строительная механика: учеб.пособие для вузов. М.: Высшая школа, 1982. 400с. <a href="https://studizba.com/files/show/pdf/16227-1-rzhanicyn-a-r--stroitel-naya-mehanika.html">https://studizba.com/files/show/pdf/16227-1-rzhanicyn-a-r--stroitel-naya-mehanika.html</a> Free access	1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.
4. Яровая А.В. Строительная механика. Статика стержневых систем. Учебное пособие: М-во образования респ. Беларусь, Белорус.гос.ун-т трансп., 2013. 447 с. <a href="http://elib.bsut.by/handle/123456789/1324?show=full">http://elib.bsut.by/handle/123456789/1324?show=full</a> Free access	1. Statistically determinate and statically indeterminate rod systems. 2. Geometrically unstable and geometrically stable rod systems. 3. Structural analysis of statically determinate multispan hinged beams. 4. Structural analysis of statically determinate frames with closed boundary shape. 5. Structural analysis of statically determinate trusses. 6. Calculation of displacements in statically determinate frames and beams. 7. Calculation basis of statically indeterminate rod systems by force method. 8. Calculation basis of statically indeterminate rod systems by the displacement method.
<u>Theory of elasticity</u>	
1. Лурье, Анатолий Исаакович. Теория упругости [Текст] / А. И. Лурье. - Москва : Наука, 1970. - 939 с. <a href="https://vk.com/wall-225686_13">https://vk.com/wall-225686_13</a> Free access	1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.
2. Лурье, Анатолий Исаакович Нелинейная	1. The Stress Tensor.

Sources in Russian	Corresponding topic
теория упругости / А. И. Лурье. - Москва : Наука, 1980. - 512 с. <a href="https://vk.com/wall-225686_13">https://vk.com/wall-225686_13</a> Free access	2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.
3. Тимошенко, Степан Прокофьевич. Теория упругости [Текст] / С. П. Тимошенко, Д. Н. Гудьер ; пер. с англ. М. И. Рейтмана ; под ред. Г. С. Шапиро. - Москва : Наука, 1975. - 575 с. <a href="https://vk.com/wall-225686_13">https://vk.com/wall-225686_13</a> Free access	1. The Stress Tensor. 2. Principal Stresses, Principal Stress Directions. 3. Deviator and Spherical Stress States. 4. Hooke's Law for Isotropic Media. 5. Infinitesimal Deformation Theory. 6. Plane Elasticity.

### Materials Science – assessment and testing

Sources in English	Topic
1. Claisse P. Civil Engineering Materials. Butterworth-Heinemann, 2016. 496 p. <a href="https://www.sciencedirect.com/book/9780081002759/civil-engineering-materials">https://www.sciencedirect.com/book/9780081002759/civil-engineering-materials</a> Limited access	1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties. 6. Concrete mix design. The design of the mix proportion of concrete. 7. Wall materials. Bricks. Blocks. Plates. 8. Steel. Steel for different applications. Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.
2. Meng Gong, Engineered Wood Products for Construction. IntechOpen, 2022. 358 p. <a href="https://www.intechopen.com/books/10584">https://www.intechopen.com/books/10584</a> Free access	1. Basics of building materials science. Structures of materials. 9. Wood. Structures of wood. Testing. Mechanical properties.
3. Samui P., Kim D., Lyer N.R., Chaudhary S. New Materials in Civil Engineering, Butterworth-Heinemann, 2020. 1043 p. <a href="https://www.sciencedirect.com/book/9780128">https://www.sciencedirect.com/book/9780128</a>	1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity.

<p><a href="#">189610/new-materials-in-civil-engineering</a> Limited access</p>	<p>Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties. 6. Concrete mix design. The design of the mix proportion of concrete. 7. Wall materials. Bricks. Blocks. Plates. 8. Steel. Steel for different applications. Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.</p>
<p>4. Yuan Q., Liu Z., Zheng K., Ma C. Civil Engineering Materials: From Theory to Practice. Woodhead Publishing, 2021. 389 p. <a href="https://www.sciencedirect.com/book/9780128228654/civil-engineering-materials">https://www.sciencedirect.com/book/9780128228654/civil-engineering-materials</a> Limited access</p>	<p>1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties. 6. Concrete mix design. The design of the mix proportion of concrete. 7. Wall materials. Bricks. Blocks. Plates. 8. Steel. Steel for different applications. Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.</p>
<p>5. Zhang H. Building Materials in Civil Engineering. Woodhead Publishing, 2011. 440 p. <a href="https://www.sciencedirect.com/book/9781845699550/building-materials-in-civil-engineering">https://www.sciencedirect.com/book/9781845699550/building-materials-in-civil-engineering</a> Limited access</p>	<p>1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing.</p>

	<p>Mechanical properties.</p> <p>6. Concrete mix design. The design of the mix proportion of concrete.</p> <p>7. Wall materials. Bricks. Blocks. Plates.</p> <p>8. Steel. Steel for different applications. Testing. Mechanical properties.</p> <p>9. Wood. Structures of wood. Testing. Mechanical properties.</p> <p>10. Heat-insulating materials.</p>
--	---

Sources in Russian	Topic
<p>1. Барабанщиков Ю.Г. Строительные материалы и изделия. 5-е изд. М.: Издательский центр «Академия», 2014. – 416 с. <a href="http://bask-rb.ru/wp-content/uploads/2020/09/Строительные-материалы-и-изделия.pdf">http://bask-rb.ru/wp-content/uploads/2020/09/Строительные-материалы-и-изделия.pdf</a> Free access</p>	<p>1. Basics of building materials science. Structures of materials.</p> <p>2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity.</p> <p>3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity.</p> <p>4. Cement. Composition. Properties.</p> <p>5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties.</p> <p>6. Concrete mix design. The design of the mix proportion of concrete.</p> <p>7. Wall materials. Bricks. Blocks. Plates.</p> <p>8. Steel. Steel for different applications. Testing. Mechanical properties.</p> <p>9. Wood. Structures of wood. Testing. Mechanical properties.</p> <p>10. Heat-insulating materials.</p>
<p>2. Мещеряков Ю.Г., Фёдоров С.В. Строительные материалы: учебник для студентов ВПО, обучающихся по направлению 270800 «Строительство» / Ю. Г. Мещеряков, С. В. Фёдоров; НОУ ДПО «ЦИПК». – СПб, 2013. – 400 с.: ил. ISBN 978-5-85855-122-5 <a href="https://lib.intuit.kg/wp-content/uploads/2020/06/%D0%AE%D0%93%D0%9C%D0%B5%D1%89%D0%B5%D1%80%D1%8F%D0%BA%D0%BE%D0%B2-%D0%A1%D0%92%D0%A4%D1%91%D0%B4%D0%BE%D1%80%D0%BE%D0%B">https://lib.intuit.kg/wp-content/uploads/2020/06/%D0%AE%D0%93%D0%9C%D0%B5%D1%89%D0%B5%D1%80%D1%8F%D0%BA%D0%BE%D0%B2-%D0%A1%D0%92%D0%A4%D1%91%D0%B4%D0%BE%D1%80%D0%BE%D0%B</a></p>	<p>1. Basics of building materials science. Structures of materials.</p> <p>2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity.</p> <p>3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity.</p> <p>4. Cement. Composition. Properties.</p> <p>5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties.</p> <p>6. Concrete mix design. The design of the mix proportion of concrete.</p> <p>7. Wall materials. Bricks. Blocks. Plates.</p>

Sources in Russian	Topic
<p><u><a href="#">2_%D0%A1%D1%82%D1%80%D0%BE%D0%B8%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D1%8B%D0%B5-%D0%BC%D0%B0%D1%82%D0%B5%D1%80%D0%B8%D0%B0%D0%BB%D1%8B-%D0%B8-%D0%B8%D0%B7%D0%B4%D0%B5%D0%BB%D0%B8%D1%8F-2013-1.pdf</a></u> Free access</p>	<p>8. Steel. Steel for different applications. Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.</p>
<p>3. Попов К.Н., Каддо М.Б. Строительные материалы и изделия. М.: Высш. шк. 2001. 367 с. <u><a href="https://www.studmed.ru/view/popov-kn-kaddo-mb-stroitelnye-materialy-i-izdeliya_279f0e12e1e.html">https://www.studmed.ru/view/popov-kn-kaddo-mb-stroitelnye-materialy-i-izdeliya_279f0e12e1e.html</a></u> Free access</p>	<p>1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties. 6. Concrete mix design. The design of the mix proportion of concrete. 7. Wall materials. Bricks. Blocks. Plates. 8. Steel. Steel for different applications. Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.</p>
<p>4. Строительные материалы и изделия: учеб. пособие / В.С. Руднов [и др.] ; под общ. ред. доц., канд. техн. наук И.К. Доманской.— Екатеринбург: Изд-во Урал. ун-та, 2018.— 203 с. ISBN 978-5-7996-2352-4 <u><a href="https://elar.urfu.ru/bitstream/10995/58610/1/978-5-7996-2352-4_2018.pdf">https://elar.urfu.ru/bitstream/10995/58610/1/978-5-7996-2352-4_2018.pdf</a></u> Free access</p>	<p>1. Basics of building materials science. Structures of materials. 2. Physical properties. Density, apparent density, bulk density. Specific gravity. Porosity. 3. Thermal properties. Temperature. Specific heat. Thermal conductivity and heat capacity. 4. Cement. Composition. Properties. 5. Concrete. Types of concrete. Components of concrete. Aggregates for concrete. Testing. Mechanical properties. 6. Concrete mix design. The design of the mix proportion of concrete. 7. Wall materials. Bricks. Blocks. Plates. 8. Steel. Steel for different applications.</p>

Sources in Russian	Topic
	Testing. Mechanical properties. 9. Wood. Structures of wood. Testing. Mechanical properties. 10. Heat-insulating materials.

#### 4.2. Recommended online courses

##### Design and construction of civil buildings

Online courses in English	Link	Summary
<u>Strength of materials</u>		
Strength of Materials	<a href="https://freevideolectures.com/course/96/strength-of-materials">https://freevideolectures.com/course/96/strength-of-materials</a>	The objective of the present course is to acquaint the students with the concept of load resultant, consequences and how different types of loads can be withstood by different types of members with some specific materials. The NPTEL lecture series on Strength of Materials is designed to explain the fundamentals in a simple and clear manner so that the students can grasp the basics of applying the loading system and its consequence in a deformable body.
Strength of Materials	<a href="https://freevideolectures.com/course/2361/strength-of-materials">https://freevideolectures.com/course/2361/strength-of-materials</a>	Solids Mechanics - Analysis of Stress and Strain - Analysis of Stress Continued - Analysis of Stress Continued - Shear Stress - Graphical Solution Mohr's Stress Circle - Illustrative Problem - Analysis of Strain - Principles of Strain - Stress-strain Relationships - Elastic Constants (Relation b/w E,K and U) - Uniaxial Tension Test - Conditions Affecting Mechanical Properties - Members subjected to Uniaxial Stress - Thermal Stress - Members subjected to Axisymmetric Loading - Change of Dimensions - Generation of Shear Stress - Simple Torsion Theory - etc.
Mechanics of Materials I: Fundamentals of Stress & Strain and Axial Loading	<a href="https://www.coursera.org/learn/mechanics-1">https://www.coursera.org/learn/mechanics-1</a>	The course covers basic topics on the fundamentals of calculating stress and strain and axial loading.
Mechanics of Materials III: Beam Bending	<a href="https://www.coursera.org/learn/beam-bending">https://www.coursera.org/learn/beam-bending</a>	The course covers basic topics on the basics of beam bending calculation.
Mechanics of Materials	<a href="https://www.coursera.org/learn/beam-bending">https://www.coursera.org/learn/beam-bending</a>	The course covers the basics of deflections,

IV: Deflections, Buckling, Loading & Theories	Combined Failure Theories	<a href="https://www.edx.org/course/learn/materials-structures">org/learn/materials-structures</a>	buckling, combined loading & failure theories.
<b>Basics of designing structures, buildings, and facilities</b>			
Purdue University: Fundamentals of Prestressed Concrete		<a href="https://www.edx.org/course/fundamentals-of-prestressed-concrete/?index=product&amp;queryID=300976fdb04278e643e3931d3340dd95&amp;position=1&amp;results_level=first-level-results&amp;term=Concrete&amp;objectID=course-c5c761af-6422-4525-aafd-067fba41e43d&amp;campaign=Fundamentals+of+Prestressed+Concrete&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch">https://www.edx.org/course/fundamentals-of-prestressed-concrete/?index=product&amp;queryID=300976fdb04278e643e3931d3340dd95&amp;position=1&amp;results_level=first-level-results&amp;term=Concrete&amp;objectID=course-c5c761af-6422-4525-aafd-067fba41e43d&amp;campaign=Fundamentals+of+Prestressed+Concrete&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch</a>	On the edX platform, the course is developed in three 1-credit modules. - Prestressed Concrete Fundamentals (this course) - Prestressed Structures - Post-Tensioned Structures.
Purdue University: Design of Steel-Concrete Composite Structures		<a href="https://www.edx.org/course/design-of-steel-concrete-composite-structures?source=aw&amp;awc=6798_1609089823_3e479685e1ad2e0a90b69f81eb8b15c4&amp;utm_source=aw&amp;utm_medium=affiliate_partner&amp;utm_content=text-link&amp;utm_term=301045_https%3A%2F%2Fwww.class-central.com%2F">https://www.edx.org/course/design-of-steel-concrete-composite-structures?source=aw&amp;awc=6798_1609089823_3e479685e1ad2e0a90b69f81eb8b15c4&amp;utm_source=aw&amp;utm_medium=affiliate_partner&amp;utm_content=text-link&amp;utm_term=301045_https%3A%2F%2Fwww.class-central.com%2F</a>	This course covers the design of composite structures with emphasis on composite beams and floor systems, composite columns, and composite walls. - Define composite action and the effect of composite action on component behavior - Describe and evaluate applicable limit states for the design of composite beams, columns, and walls - Design composite beams, columns, and walls using AISC360 provisions.
Purdue University: Steel Beam and Plate Girder Design		<a href="https://www.edx.org/course/steel-beam-and-plate-girder-">https://www.edx.org/course/steel-beam-and-plate-girder-</a>	This course covers the design of built-up plate girders with emphasis on proportioning, shear and flexural strength,

	<a href="https://www.udemy.com/course/design?source=aw&amp;awc=6798_1609090130_1608fb92147fc5c1f7eeb3e7a6d1b5f9&amp;utm_source=aw&amp;utm_medium=affiliate_partner&amp;utm_content=text-link&amp;utm_term=301045_https%3A%2F%2Fwww.class-central.com%2F">design?source=aw&amp;awc=6798_1609090130_1608fb92147fc5c1f7eeb3e7a6d1b5f9&amp;utm_source=aw&amp;utm_medium=affiliate_partner&amp;utm_content=text-link&amp;utm_term=301045_https%3A%2F%2Fwww.class-central.com%2F</a>	and local/global stability.
Fundamentals of Structural Analysis	<a href="https://www.udemy.com/course/statics-for-engineering-undergrads/?utm_medium=website&amp;utm_source=archdaily.com">https://www.udemy.com/course/statics-for-engineering-undergrads/?utm_medium=website&amp;utm_source=archdaily.com</a>	The online course explores the problems of analysis and calculation of building structures.
<b>Urban planning</b>		
Shaping Urban Futures	<a href="https://www.coursera.org/learn/shaping-urban-futures">https://www.coursera.org/learn/shaping-urban-futures</a>	This course examines the major directions for addressing the problems of global urbanization. The course demonstrates how an interdisciplinary approach reveals the interrelated issues of health, climate change, migration, and informality in places that will face the greatest challenges of rapid, unplanned urbanization.
Regional Planning: Basic Concepts and Its Contextualization	<a href="https://www.udemy.com/course/regional-planning/">https://www.udemy.com/course/regional-planning/</a>	This course contains the following sections: <ul style="list-style-type: none"> <li>• Discuss basic concepts and principles of regional planning;</li> <li>• Review the theories of regional planning;</li> <li>• Complete a case study of regional and urban issues;</li> <li>• Evaluate the current situation and future of the city in regional aspect.</li> </ul>
City Planning from Ancient Times to Today	<a href="https://www.udemy.com/course/city-planning/">https://www.udemy.com/course/city-planning/</a>	This course contains the following sections: <ul style="list-style-type: none"> <li>• History and theory of city planning from ancient times to modern day;</li> <li>• Innovations and debates in city planning.</li> <li>• Analysis of the key challenges facing city planners in the future, as well as some potential solutions.</li> </ul>
An Introduction to Urban Planning and	<a href="https://www.udemy.com/course/an-">https://www.udemy.com/course/an-</a>	This course contains the following sections: <ul style="list-style-type: none"> <li>• Basics of urban planning and Urban</li> </ul>

Design	<a href="#"><u>introduction-to-urban-planning-and-design/</u></a>	Design; <ul style="list-style-type: none"> <li>• - The role of Urban Planners and Urban Designers in Neighborhood Development;</li> <li>• Key framework for Sustainable Development and Urban Renewal;</li> <li>• A recent trends in New urban planning</li> <li>• Role and impact of urban planning and Urban Design.</li> </ul>
Learn Urban Planning Concepts	<a href="https://www.udemy.com/course/urban-planning-concepts/"><u>https://www.udemy.com/course/urban-planning-concepts/</u></a>	This course contains the following sections: <ul style="list-style-type: none"> <li>• An indepth view of successful urban planning concepts;</li> <li>• Overview of Livable, future and smart cities;</li> <li>• Insight into neighborhood planning concepts;</li> <li>• Case study showing different planning concepts in practice.</li> </ul>
The MIT Media Lab: Beyond Smart Cities: Emerging Design and Technology	<a href="#"><u>The MIT Media Lab: Beyond Smart Cities: Emerging Design and Technology   edX</u></a>	Course curriculum: Module 1: Design and technology for people-centric cities Module 2: The mobility revolution and urban robotics Module 3: The live-work transformation: Robotics, prefabrication, and IoT technology Module 4: A network of neighborhoods: AI, real-time simulation, and emerging systems Module 5: Sustainable communities: Local production and lower consumption Module 6: Governance: Token economies and algorithmic zoning for prosocial behaviors
Modeling Urban Ecosystems	<a href="#"><u>Modeling urban ecosystems – Stepik</u></a>	This course aims to improve the understanding of properties, processes, functions, and services of urban ecosystems.  The course aims to provide a better understanding of the mutual interactions between citizens and the surrounding urban environment and provide a relevant tool to analyze and model these interactions and their consequences.
Online courses in Russian	Link	Summary

<u>Strength of materials</u>		
Соппротивление материалов (Material resistance)	<a href="https://openedu.ru/course/misis/MATSTR/?session=spring_2023">https://openedu.ru/course/misis/MATSTR/?session=spring_2023</a>	The course covers strength and stiffness calculations under various types of deformations - axial tension and compression, torsion, bending, shear and buckling, complex resistance; thin-walled shells and thick-walled pipes under internal and external pressure, stability of compressed beams under longitudinal forces, structural strength under cyclic loads and impact loads.
Соппротивление материалов. Часть 1. Основные положения, растяжение-сжатие прямолинейных стержней, кручение прямолинейных стержней, простой изгиб, сложный изгиб (Material resistance. Part 1. Fundamentals, tension-compression of straight rods, torsion of straight rods, simple bending, complex bending)	<a href="https://openedu.ru/course/mephi/mephi_sm1/">https://openedu.ru/course/mephi/mephi_sm1/</a>	This course covers the basic principles and assumptions of strength of materials, theoretical and practical aspects of strength and stiffness calculations for beam systems under various types of loading.
Соппротивление материалов. Часть 2. Теория напряжений, теория предельных состояний, устойчивость, толстостенные трубы, осесимметричные пластины (Material resistance. Part 2. Stress theory, theory of limit states, stability, thick-walled pipes, axisymmetric plates)	<a href="https://openedu.ru/course/mephi/mephi_sm2/">https://openedu.ru/course/mephi/mephi_sm2/</a>	This lecture course covers the analysis of statically indeterminate plane frames, theoretical and practical aspects of beam stability analysis. The course emphasizes problem solving.
<u>Basics of designing structures, buildings, and facilities</u>		
Основы расчета строительных	<a href="https://openedu.ru/course/spbstu/BASBUIL">https://openedu.ru/course/spbstu/BASBUIL</a>	During the course, a variety of construction designs are illustrated through numerous

конструкций (Basics of structural calculation)	D/	examples, covering a wide range of materials and structural schemes.
Urban planning		
Устойчивое развитие транспортных систем городов (openedu.ru) (Sustainable development of urban transport systems (openedu.ru))	<a href="https://openedu.ru/course/spbstu/SDUTS/?session=spring_2024">https://openedu.ru/course/spbstu/SDUTS/?session=spring_2024</a>	The goal of this course is to provide the audience with a systematic knowledge of the characteristics of sustainable development of urban transport systems.
Общественные пространства (Public spaces)	<a href="https://arhitektoři.рф/courses/dostupnaya-i-inklyuzivnaya-sreda">Общественные пространства — Архитекторы.рф (xn--80akjuiemcz7e.xn--p1ai)</a>	This course covers the basic principles of public space design.
Доступная и инклюзивная среда (Accessible and inclusive environment)	<a href="https://arhitektoři.рф/courses/dostupnaya-i-inklyuzivnaya-sreda">https://arhitektoři.рф/courses/dostupnaya-i-inklyuzivnaya-sreda</a>	This online course focuses on the design of accessible environments, the development of inclusive architectural solutions, and ways to integrate them into the urban fabric.

### Construction technology

Online courses in English	Link	Summary
Master of Science in Construction Management	<a href="https://www.coursera.org/degrees/ms-construction-management-lsu-online">https://www.coursera.org/degrees/ms-construction-management-lsu-online</a>	The construction management course covers the topics of professional services, including the supervision and control of the performance of tasks and activities during the construction phase.
Sustainable construction and environmental aspects	<a href="https://www.classcentral.com/course/construction-the-university-of-maryland-college-p-46427">https://www.classcentral.com/course/construction-the-university-of-maryland-college-p-46427</a>	This course covers sustainable construction management project elements from conception to completion. Syllabus: <ul style="list-style-type: none"> <li>• Week 1: Sustainable design management.</li> <li>• Week 2: Sustainable construction management.</li> <li>• Week 3: Sustainable maintenance operations, security systems, environmental management, and building systems.</li> <li>• Week 4: Energy management and renewable energy, green building construction, and strategic sustainable planning.</li> </ul>
Concrete Multi Storey	<a href="https://www.coursera.org/degrees/ms-construction-management-lsu-online">https://www.coursera.org/degrees/ms-construction-management-lsu-online</a>	The course covers the basics of structural

Building - System Design	<a href="https://www.classcentral.com/course/construction-project-management-7105">org/specializations/concrete-multi-storey-building-system-design</a>	design, taking into account the requirements of modern technologies. The course also touches upon the topics of load calculation, structural analysis, and reinforcement detailing in a hands-on manner. The practical emphasis ensures the ability to make informed design decisions, covers reinforcement detailing and methods for quantifying concrete and steel, and enhances project estimating skills.
Construction Management (class centre)	<a href="https://www.classcentral.com/course/construction-project-management-7105">https://www.classcentral.com/course/construction-project-management-7105</a>	Construction Project Management introduces learners to project initiation and planning. There are 10 modules that allow learners to become familiar with construction management within the dynamic construction industry.
<b>Online courses in Russian</b>	<b>Link</b>	<b>Summary</b>
Управление строительными проектами (Construction project management)	<a href="https://www.coursera.org/learn/construction-project-management">https://www.coursera.org/learn/construction-project-management</a>	The construction management course covers the process of planning, coordinating, and controlling all phases of construction, from design to completion of the finished project, building information modeling, and technology trends in projects.
Основы BIM для инженеров (BIM fundamentals for engineers)	<a href="https://www.coursera.org/learn/bim-fundamentals">https://www.coursera.org/learn/bim-fundamentals</a>	The course is designed for students to learn the essential concepts of BIM, and the basic technical skills to create and manipulate a BIM model. Those skills include how to retrieve information from a BIM model and how to use common modeling tools.
Технология строительного производства (ТСП) (Building technology)	<a href="#">Технология строительного производства (ТСП) – Stepik</a>	The aim of the course is to study the theoretical and practical foundations and methods of construction and installation work production.

### Transport system

Online courses in English	Link	Summary
Civil - Introduction to Transportation Engineering	<a href="#">Civil - Introduction to Transportation Engineering - YouTube</a>	Lecture Series on Introduction to Transportation Engineering by Prof. Bhargab Maitra and Prof. K. Sudhakar Reddy, Department of Civil

<p>WBGx: e-Learning course on Appraising the wider Economic Benefits of Transport Corridor Investments</p>	<p><a href="https://www.edx.org/learn/transportation/world-bank-group-e-learning-course-on-appraising-the-wider-economic-benefits-of-transport-corridor-investments?index=product&amp;queryID=0c5729dfa2a5e721fa3b12849331abfa&amp;position=1&amp;results_level=first-level-results&amp;term=Transport+infrastructure&amp;objectID=course-e68099ab-a352-450c-90c3-8b35bec8b24&amp;campaign=e-Learning+course+on+Appraising+the+wider+Economic+Benefits+of+Transport+Corridor+Investments&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch">https://www.edx.org/learn/transportation/world-bank-group-e-learning-course-on-appraising-the-wider-economic-benefits-of-transport-corridor-investments?index=product&amp;queryID=0c5729dfa2a5e721fa3b12849331abfa&amp;position=1&amp;results_level=first-level-results&amp;term=Transport+infrastructure&amp;objectID=course-e68099ab-a352-450c-90c3-8b35bec8b24&amp;campaign=e-Learning+course+on+Appraising+the+wider+Economic+Benefits+of+Transport+Corridor+Investments&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch</a></p>	<p>Engineering, IIT Kharagpur.</p> <p>The course reviews case studies of past and current corridor initiatives, provides a rigorous analysis of the literature on the spatial impacts of corridors, and offers assessments of corridor investment projects supported by international development organizations. A series of spotlights examine issues such as private sector co-investment, the impact of corridors on small businesses and women, and challenges in implementing cross-border corridors.</p>
<p>University of Cape Town: Supply Chain Management</p>	<p><a href="https://www.edx.org/executive-education/university-of-cape-town-supply-chain-management?index=product&amp;queryID=bf76b171cb3bfc508c3daa6944c26ae9&amp;position=1&amp;results_level=first-level-results&amp;term=Transport&amp;objectID=course-fe2f341e-493d-42c4-8d0d-0661b490c2cb&amp;campaign=Supply+Chain+Management&amp;source=2u&amp;product_category=executive-education&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch">https://www.edx.org/executive-education/university-of-cape-town-supply-chain-management?index=product&amp;queryID=bf76b171cb3bfc508c3daa6944c26ae9&amp;position=1&amp;results_level=first-level-results&amp;term=Transport&amp;objectID=course-fe2f341e-493d-42c4-8d0d-0661b490c2cb&amp;campaign=Supply+Chain+Management&amp;source=2u&amp;product_category=executive-education&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch</a></p>	<p>The Supply Chain Management online short course introduces the basic concepts of production, inventory, storage, and transportation of goods and services, and what it takes to manage your supply chains efficiently and effectively.</p>
<p>EPFLx: Intro to Traffic Flow Modeling and Intelligent Transport Systems (edX)</p>	<p><a href="https://www.edx.org/learn/engineering/ecole-polytechnique-federale-de-lausanne-intro-to-traffic-flow-modeling-and-intelligent-transport-systems?index=product&amp;queryID=a8d24fa13a09cd764c9b7d14b0a">https://www.edx.org/learn/engineering/ecole-polytechnique-federale-de-lausanne-intro-to-traffic-flow-modeling-and-intelligent-transport-systems?index=product&amp;queryID=a8d24fa13a09cd764c9b7d14b0a</a></p>	<p>This course focuses on understanding traffic congestion and exploring ways to improve mobility through advanced traffic management systems.</p>

	<a href="https://www.edx.org/search?position=2&amp;results_level=first-level-results&amp;term=Transport&amp;objectID=course-ae05e859-22b1-4fe2-86ad-7629d6f9a38f&amp;campaign=Intro+to+Traffic+Flow+Modeling+and+Intelligent+Transport+Systems&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch">c412e&amp;position=2&amp;results_level=first-level-results&amp;term=Transport&amp;objectID=course-ae05e859-22b1-4fe2-86ad-7629d6f9a38f&amp;campaign=Intro+to+Traffic+Flow+Modeling+and+Intelligent+Transport+Systems&amp;source=edX&amp;product_category=course&amp;placement_url=https%3A%2F%2Fwww.edx.org%2Fsearch</a>	
<b>Online courses in Russian</b>	<b>Link</b>	<b>Summary</b>
Информационные технологии в транспорте (Information technologies in transportation)	<a href="https://openedu.ru/course/spbstu/ITT/?session=spring_2024">https://openedu.ru/course/spbstu/ITT/?session=spring_2024</a>	The course provides knowledge and skills in the efficient use of automated, robotic, and information systems in transportation.
Устойчивое развитие транспортных систем городов (Sustainable development of urban transportation systems)	<a href="https://openedu.ru/course/spbstu/SUDUTS/?session=spring_2024">https://openedu.ru/course/spbstu/SUDUTS/?session=spring_2024</a>	The aim of this course is to provide participants with a structured understanding of the characteristics of sustainable development of urban transport systems.
Территориально-транспортное планирование городских поселений (Territorial and transportation planning of urban settlements)	<a href="https://stepik.com/course/territorialno-transportnoe-planirovaniye-gorodskikh-poseleniy">Территориально-транспортное планирование городских поселений – Stepik</a>	The purpose of the course is to form a student's system of basic knowledge in the field of transportation planning.

**Mechanics**

<b>Online courses in English</b>	<b>Link</b>	<b>Summary</b>
Fundamentals of Structural Analysis	<a href="https://www.udemy.com/course/statics-for-engineering-undergrads/?utm_medium=website&amp;utm_source=archdaily.com">https://www.udemy.com/course/statics-for-engineering-undergrads/?utm_medium=website&amp;utm_source=archdaily.com</a>	Fundamentals of Structural Analysis introduces engineering and architecture students, to the basic techniques for analyzing the most common structural elements, including: beams, trusses, frames, cables, and arches.
Mechanics of Materials I: Fundamentals of Stress &	<a href="https://www.coursera.org/learn/mechanics-">https://www.coursera.org/learn/mechanics-</a>	The course covers the following topics:

Strain and Axial Loading	<a href="https://www.coursera.org/learn/engineering-mechanics-statics-2?irclid=xOxWoo2vUxyPWMXUVWY2ITICUkFwX0RdHxVyQw0&amp;irgwc=1&amp;utm_medium=partners&amp;utm_source=impact&amp;utm_campaign=3400355&amp;utm_content=b2c">1?irclid=xOxWoo2vUxyP WMXUVWY2ITICUkFwX0R dHxVyQw0&amp;irgwc=1&amp;utm medium=partners&amp;utm_sourc e=impact&amp;utm_campaign=34 00355&amp;utm_content=b2c</a>	fundamentals of stress, strain, and axial Loading
Applications of theoretical mechanics	<a href="https://www.coursera.org/learn/engineering-mechanics-statics-2?irclid=xOxWoo2vUxyPWMXUVWY2ITICUkFwX21RHxVyQw0&amp;irgwc=1&amp;utm_medium=partners&amp;utm_source=impact&amp;utm_campaign=3400355&amp;utm_content=b2c#about">https://www.coursera.org/lear n/engineering-mechanics- statics- 2?irclid=xOxWoo2vUxyP WMXUVWY2ITICUkFwX21 RHxVyQw0&amp;irgwc=1&amp;utm medium=partners&amp;utm_sourc e=impact&amp;utm_campaign=34 00355&amp;utm_content=b2c#abo ut</a>	The course covers the following topics: the basic techniques for analyzing the most common structural elements, including: beams, trusses, frames, cables, and arches.
Engineering of Structures: Compression	<a href="https://www.coursera.org/learn/engineering-of-structures-compression#about">https://www.coursera.org/lear n/engineering-of-structures- compression#about</a>	The course covers the major topics of structural design with special emphasis on compression.
Engineering of Structures: Tension and Compression	<a href="https://www.coursera.org/learn/engineering-of-structures-tension-and-compression#outcomes">https://www.coursera.org/lear n/engineering-of-structures- tension-and- compression#outcomes</a>	The course covers the major topics of structural design with special emphasis on tension and compression.
Engineering of Structures: Shear and Bending	<a href="https://www.coursera.org/learn/engineering-of-structures-shear-and-bending#about">https://www.coursera.org/lear n/engineering-of-structures- shear-and-bending#about</a>	The course covers the major topics of structural design with special emphasis on shear and bending.
<b>Online courses in Russian</b>	<b>Link</b>	<b>Summary</b>
Строительная механика (Construction mechanics)	<a href="http://stroitmeh.ru">Строительная механика (stroitmeh.ru)</a>	Problems and methods of structural mechanics; geometric invariance conditions of beam systems; connections; degrees of freedom; quantitative analysis; structural analysis of structures, etc.
Базовый курс по строительной механике (Basic course in structural mechanics)	<a href="http://tilda.ws">Строительная механика (tilda.ws)</a>	The course program includes 4 sections: 1. Beam - Calculation of a beam (basic concepts, sign convention) - Calculation of a multi-span

		beam - etc. 2. Frame - Calculation of a simple frame - Calculation of a three-hinged frame - Calculation of a frame with a tie - etc. 3. Truss - Calculation of forces analytically and using influence lines; angular truss - etc. 4. Arch - Determination of forces in the section of an arch - etc.
Теория упругости (Elasticity theory)	<u>Открытое образование - Теория упругости (openedu.ru)</u>	The main objectives of the online course "Theory of elasticity. Part 1" are: <ul style="list-style-type: none"> <li>• description of the main topics of elasticity theory;</li> <li>• study of the basic methods of design of structures and their elements;</li> <li>• tasks on the topic of elasticity theory.</li> </ul>

### Materials Science – assessment and testing

Online courses in English	Link	Summary
Materials behavior	<a href="https://www.coursera.org/learn/material-behavior">https://www.coursera.org/learn/material-behavior</a>	The course includes material on the main issues of types of building materials, information on production technology and basic technical properties of building materials.
Material processing (Coursera)	<a href="https://www.coursera.org/learn/material-science-engineering">https://www.coursera.org/learn/material-science-engineering</a>	This course covers topics related to the production and processing of building materials and their use in the

		structural design of the building.
Design of Steel-Concrete Composite Structures (EDX)	<a href="https://www.edx.org/course/design-of-steel-concrete-composite-structures">https://www.edx.org/course/design-of-steel-concrete-composite-structures</a>	This course covers the design of composite structures with emphasis on composite beams and floor systems, composite columns, and composite walls.
Sustainable building with timber (EDX)	<a href="https://www.edx.org/course/building-with-timber/">https://www.edx.org/course/building-with-timber/</a>	The course covers the means of timber application in construction as well as implementation of sustainable forestry technologies.
<b>Online courses in Russian</b>	<b>Link</b>	<b>Summary</b>
Основы расчета строительных конструкций (Basics of structural elements design calculation)	<a href="https://openedu.ru/course/spbstu/BASBUILD/">https://openedu.ru/course/spbstu/BASBUILD/</a>	The course covers the topic loads and actions on structures. The focus of the course is on the calculation of structural elements such as beams, columns, slabs, walls and arches.
Строительные материалы (Construction materials)	<a href="#">Строительные материалы – Stepik</a>	The course is the basis for further study in a number of specialized engineering disciplines: building structures, construction technology, water supply, heat supply, ventilation, design, highway design, etc.
Строительные материалы. Подборка лекций МГСУ (Construction materials. Selection of lectures by MSCU)	<a href="#">Строительные материалы. Подборка лекций МГСУ..   DWG ФОРМАТ ПРОЕКТИРОВАНИЕ (vk.com)</a>	Lectures: Natural stone materials; Wood; Ceramics; Laboratory work; Glass and materials based on it; Metal materials in construction, etc.