

# Materials Science

## M.Sc. education program

[crei.skoltech.ru/cest/education/materials-science-program](http://crei.skoltech.ru/cest/education/materials-science-program)

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**Skoltech**

Skolkovo Institute of Science and Technology

# Where to get information

*Where to look:*

- [crei.skoltech.ru/cest/education/materials-science-program](http://crei.skoltech.ru/cest/education/materials-science-program)

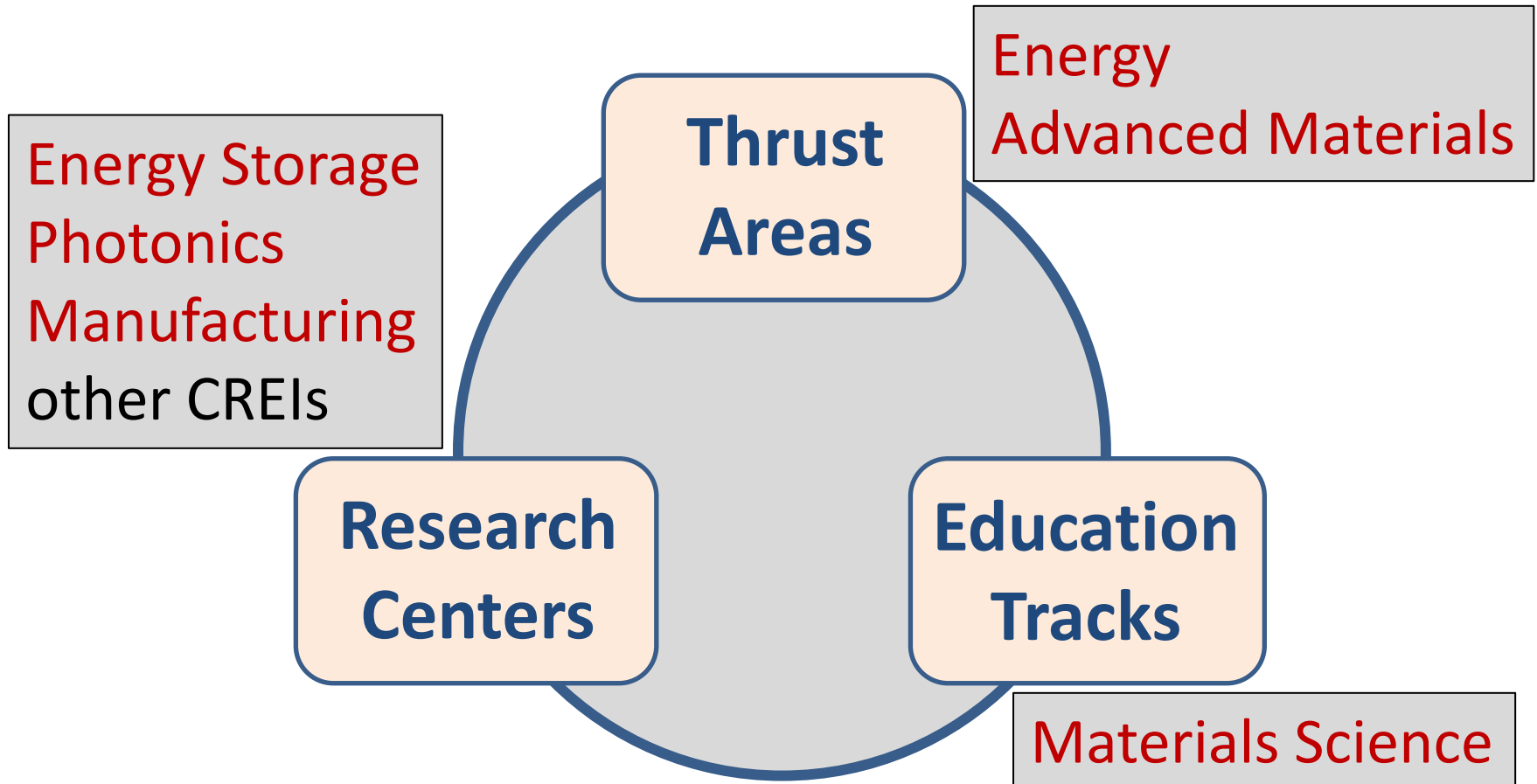
*Whom to ask:*

- Your academic/research advisor
- Program Coordinator – Andriy Zhugayevych
  - Experimental Materials Science – Artem Abakumov
  - Computational Materials Science – Andriy Zhugayevych
- Education Office

*For other contacts see the program web-page (above)*

# Skoltech research & education environment

- No separate theory or experiment departments
- No separate physics or chemistry departments



# Materials Science track: courses

## *Core courses*

- Survey of Materials (**Term 1B**)
- Materials Chemistry (**Term 2**)

## ***Experimental Materials Science***

### *Recommended courses*

- Introduction to Solid State Physics(**2**)
- Material Structure Characterization Methods (**3**)
- Organic Materials for Electronics, Energy Conversion and Storage (**3**)
- Carbon Nanomaterials (**3**)
- Electrochemistry (**4**)
- Materials Selection in Design (**5**)

## ***Computational Materials Science***

### *Recommended courses*

- Computational Chemistry and Materials Modeling (**2**)
- Structure & Property of Materials (**3**)
- Advanced Materials Modeling (**4**)
- Materials Selection in Design (**5**)
- Advanced Solid State Physics (**6**)

## *Elective courses*

- discuss with your advisor

# Materials Science track: other activities

## Understand your load:

- 1 full course = 20 hours per week (except for Term 1B)
- *Hint*: combine research and education

## Seminars (1 hour per week):

- Research Seminar “Advanced Materials Science” – core
- Energy Colloquium – optional
- Computational Materials Science seminar – for subtrack
- Your group seminars – per advisor

## Background courses (half-course per term):

- Math for Engineers, Quantum Mechanics (Term 1B!)
- English, Writing, Presentation, Pedagogy

## Introductory courses from other programs (see webpage)

## Advanced courses (see webpage)

# M.Sc. Research in Materials Science

## In brief

- *Highly interdisciplinary*
- Experimental Materials Science with most publications on:
  - energy storage – Abakumov, Antipov, Stevenson
  - optoelectronics including solar cells – Nasibulin, Troshin
  - materials engineering – Korsunsky
- Computational Materials Science with most publications on:
  - methods – Gonze, Levchenko, Shapeev
  - applications – Oganov, Tretiak, Zhugayevych
  - theoretical chemistry and physics – Buchachenko, Fine
- ... with details on faculty web-pages: [example](#)
- Research topics will be covered on Survey of Materials course

## M.Sc. Thesis 2016-2019

- Materials for energy conversion and storage (22 students)
- Materials for optoelectronics (4 students)
- Other materials and computational methods (7 students)

# Academic calendar and important deadlines

## Academic Year - MSc YEAR 1

27-Aug-18	03-Sep-18	10-Sep-18	17-Sep-18	24-Sep-18	01-Oct-18	08-Oct-18	15-Oct-18	22-Oct-18	29-Oct-18	05-Nov-18	12-Nov-18	19-Nov-18	26-Nov-18	03-Dec-18	10-Dec-18	17-Dec-18	advisor, program, II plans							04-Feb-19	11-Feb-19	18-Feb-19	25-Feb-19	04-Mar-19	11-Mar-19	academic mobility contest							27-Apr-19	06-May-19	13-May-19	20-May-19	27-May-19	03-Jun-19	10-Jun-19	17-Jun-19	24-Jun-19	01-Jul-19	08-Jul-19	15-Jul-19	22-Jul-19	29-Jul-19	05-Aug-19	12-Aug-19	19-Aug-19								
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8								2	3	4	5	6	7								7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Orientation	TERM 1A				TERM 1B			TERM 2								Vacation		ISP		TERM 3							TERM 4					Vacation		TERM 4			SUMMER TERM								Vacation																
31 Aug-01 Sep	IW	IW	IW	IW	C	C	C	E	C	C	C	C	C	C	E	E	V	V	ISP	ISP	ISP	C	C	C	C	C	C	E	E	C	C	C	C	C	V	V	C	E	E	II	II	II	II	II	II	II	II	V	V	V	V										
Core courses																	Education, get basic skills										Practice																																		

## Academic Year - MSc YEAR 2

27-Aug-18	03-Sep-18	10-Sep-18	17-Sep-18	24-Sep-18	01-Oct-18	08-Oct-18	15-Oct-18	22-Oct-18	29-Oct-18	05-Nov-18	12-Nov-18	19-Nov-18	26-Nov-18	03-Dec-18	10-Dec-18	17-Dec-18	24-Dec-18	31-Dec-18	07-Jan-19	14-Jan-19	21-Jan-19	28-Jan-19	04-Feb-19	11-Feb-19	18-Feb-19	25-Feb-19	04-Mar-19	11-Mar-19	18-Mar-19	25-Mar-19	01-Apr-19	08-Apr-19	15-Apr-19	22-Apr-19	29-Apr-19	06-May-19	13-May-19	20-May-19	27-May-19	03-Jun-19	10-Jun-19	17-Jun-19	24-Jun-19	01-Jul-19	08-Jul-19	15-Jul-19	22-Jul-19	29-Jul-19	05-Aug-19	12-Aug-19	19-Aug-19
project				3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	1	2	3	1	draft				6	7	8	1	2	3	4	5	final			8	1	2	3	4	1	2	3	3	3	3	3	3
Vacation	TERM 5								TERM 6							Vacation	ISP			TERM 7						TERM 8				Vacation	TERM 8		JUNE				Vacation														
V	C	C	C	C	C	C	E	E	C	C	C	C	C	C	E	E	V	V	C	C	C	C	C	C	C	C	C	E	E	C	C	C	C	C	V	V	C	E	E	MS	MS	MS	MS	V	V	V	V	V	V	V	V
Thesis research																											Defense																								
KEY:																																																			

KEY:

- Innovation Workshop
- Credit-bearing activity (course, research)
- Evaluation period (assessment and application period)
- Industrial Immersion

- Independent Studies Period
- Vacation
- MSc Thesis Defence

# Approximate plan for first 5 months

## Term 1A:

- Innovation Workshop (40 hours per week)

## Term 1B:

- Survey of Materials course (40 hours per week)
- Either 3-credit background course (if needed) or seminars (at least 1 per week for 2 years)

## Term 2:

- Materials Chemistry course (20 hours per week)
- Another 6-credit course (Intro to Solid State Physics, Computational Chemistry and Materials Modeling etc.)
- Optionally 3-credit research or elective course

## January:

- Choose advisor and research field, plan next 6 months
- ISP courses if needed or research