

	Department Website : https://www.iitk.ac.in/mse/ Materials Science and Engineering (MSE) Department
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MSE

Q1. What is the structure of the core curriculum in this department?

Ans.

The core curriculum in this department is well-structured and focuses on the critical role of engineering materials in technological advancement. Core courses begin in the 3rd semester and continue through the 3rd year, starting with foundational subjects like thermodynamics and rate processes, and progressing to advanced topics in materials science and metallurgy.

Lab courses are integrated extensively, with two core lab courses each semester from the 3rd to 6th semester, and they are closely aligned with theoretical content, enhancing practical understanding.

A unique aspect of the curriculum is its flexibility—there is only one prerequisite course, allowing students to plan their academic path according to their interests. The 3rd semester includes a useful course on statistics and probability (MSE-204), beneficial for those interested in machine learning and data science.

The 4th year primarily involves Department and Open Electives, giving students the freedom to explore specialized interests. By then, academic pressure eases, and students often focus on placements or extracurricular engagements.

[Detailed curriculum link](#)

Q2. How flexible is the curriculum of this department in terms of open electives (OEs) and minors?

Ans.

The curriculum is relatively tight until the 6th semester, allowing for only 1–2 Open Electives early on. However, the structure is designed to offer significant flexibility from the 6th semester onward. Most OEs are intended to be taken in the final year when there are no core department compulsory courses, giving students ample freedom to explore courses of personal interest.

The department allocates 54 credits for OEs, which is substantial. With careful planning, students can pursue up to two minors in other departments (each requiring 27 credits). From the 3rd year onward, the course load eases, making it feasible for students to take OEs and minors, depending on their academic performance (CPI) and interests.

Overall, while the early semesters are packed, the later semesters provide a high degree of flexibility for academic exploration beyond the core curriculum.

Q3. What is the teaching style, and how approachable are the professors in your department?

Ans.

Professors in the department are highly knowledgeable and active in their respective research fields. Many are enthusiastic about working with undergraduate students on projects and are open to mentoring those who show interest.

The teaching style varies across professors—some are excellent communicators, while others may not be as engaging despite their subject expertise. While a few may rush through content or set challenging questions, most make a genuine effort to address student doubts during or after class.

Professors are generally approachable and responsive. Students are encouraged to ask questions in class, reach out via email, or visit during office hours. Regular class attendance and genuine engagement often lead to opportunities for research projects or guidance.

Given the department's emphasis on lab work, professors also play an active role in conducting hands-on lab sessions, ensuring students understand the use and importance of various research facilities.

Q4. Are there interdisciplinary opportunities in the department?

Ans.

Yes, the department offers ample interdisciplinary opportunities. Fields such as **Integrated Computational Materials Engineering (ICME)** blend materials science with **AI/ML, computational modeling, and data science**. Courses like *Introduction to ML in Materials Science and Engineering* expose students to these modern intersections.

There are also strong interdisciplinary connections with **bioengineering, aerospace, mechanical engineering, and nanotechnology**. Students are encouraged to approach

professors with research ideas that combine knowledge from different domains—be it computational tools, design, or scientific modeling.

The department actively supports such cross-disciplinary exploration through electives, projects, and research initiatives.

Refer: <https://www.iitk.ac.in/mse>

Q5. How difficult is the coursework in the first two/three years?

Ans.

The difficulty of coursework in the first two to three years is generally **moderate** and **manageable** with discipline and regular attendance. If students follow the department's recommended template and stay consistent with lectures and assignments, they should be able to score well.

The **first year** consists of institute-level compulsory courses common across all branches. From the **second year onwards**, students start core MSE courses along with **two lab sessions per semester**, which are time-consuming but aligned with theory content. The **third year** continues with similar lab intensity (including up to three lab sessions per week in the 6th semester), which can be challenging and time-demanding.

Overall, most courses are **easy to medium** in terms of difficulty. Success largely depends on attending classes, clearing doubts, and understanding the professor's grading style. Some professors may follow strict or D+ centric grading, so being proactive in such courses is important.

Q6. What are the typical class sizes and student-to-faculty ratio?

Ans.

The typical class size for department compulsory courses is roughly the batch size, around 85 to 100 students. For department electives, class sizes vary from about 10 to 40 students. The department has around 30 faculty members for a batch of 90-100 students, leading to an overall student-to-faculty ratio of approximately 3 to 4 students per faculty member.

More specifically:

- During lectures, the ratio is about 90:1.
- Tutorial sessions have a better ratio around 30:1, with additional faculty assisting in doubt clearing.
- Lab sessions have the best ratio, around 5:1, as PhD students and staff also help during labs.

In some cases, considering the number of courses (about 6 per semester), the worst-case student-to-faculty ratio can be about 15:1, but labs improve this significantly. Overall, the department is well-staffed, and students get adequate access to faculty support.

Q7. How easy or difficult is it to branch out of/into this department?

Ans.

Branch change into this department can be relatively easier compared to some others, with the previous CPI cutoff around 6.6 for entry. To branch out from this department, the difficulty depends on the target branch and the competition for it. For example, branch changes to Mechanical or Chemical Engineering require a CPI of about 8.5, Mathematics around 9, and Electrical Engineering around 9.3.

If you want to change into this department, maintaining a CPI above 6 in your first year is generally enough. However, branching out depends heavily on your CPI and the demand for other branches.

Based on batch performance and general advice, it's suggested not to shift unless you get a branch considered "better" like Mechanical Engineering or other circuitual branches in this order of preference: CSE > EE > MTH/SDS > ECO > MECH. Among the rest, MSE is relatively better and more interesting. Other branches tend to be more work-intensive without significant advantages.

Q8. What advice would you give to me if I aim for a branch change out of this department after the end of my first year? Should I do it, and how could I do it?

Ans.

If your primary goal is good placements, switching to a circuitual branch like CSE, EE, MTH, or SDS can help, as these branches generally have better placement opportunities. If you are changing to a non-circuitual branch, it may not make much difference for placements.

Branch change depends heavily on your CPI from the first two semesters, so focusing on academics is crucial. Typically, a CPI above 9 after the first year is needed to change into branches like EE, MTH, or CSE. Otherwise, it may not be worth changing since the MSE department offers good opportunities in areas like semiconductor manufacturing, quantum physics, and electronic device manufacturing, where active research is ongoing.

If your interest lies in coding or non-circuitual domains like software development, it's advisable to switch branches because many software companies may not recruit from MSE as readily. Target branches like CSE or EE if you have the capability. However, if you want to explore the core of this branch or have genuine interest, staying in MSE is fine.

Regardless of whether you get the branch change or not, aiming to maximize your CPI is important. Even if you don't change, a strong CPI opens up better opportunities.

Q9. Is this department good for pursuing higher studies abroad or for placements?

Ans.

This department is excellent for pursuing higher studies abroad because of the significant amount of active research ongoing in cutting-edge fields such as semiconductors, nanomaterials, and applications of machine learning within materials science. Many seniors from the department have successfully gone abroad for their masters and PhDs.

For placements, core opportunities within the department are relatively limited, especially for undergraduate students, as many core companies prefer to recruit master's students. However, there are ample non-core placement opportunities in areas like software development (SDE), data analytics, consulting, and finance, which are open to graduates from this department.

Materials Science is a highly interdisciplinary field with research teams that value material scientists, who can earn very well, especially after completing a good master's or PhD program. For those focused on core placements, it's often better to consider branch changes to circuitual branches (like CSE, EE) where opportunities are more plentiful. Success in placements also depends greatly on CPI and additional skills.

Q10. What are the typical career paths taken by graduates from this branch?

Ans.

Graduates from this department follow diverse career paths including:

- Around 5-6 students from a batch of about 80 pursue master's degrees abroad or convert to M.Tech programs.
- About 50-60 students participate in campus placements, targeting roles in software development (SDE), consulting, and some core technical roles.
- Several students (3-4) engage in startups, either working part-time or committing full-time later.
- A portion (around 10-15) prepare for MBA entrance exams like CAT to pursue management studies at institutes like IIM.
- Many graduates take up corporate jobs in core industries such as oil and gas, manufacturing, and automobile sectors.
- Others get placed in top software companies in roles related to software development or machine learning.
- Some opt for careers in finance, consulting, or product management.
- Further studies, either in the same or related fields, is also a common path.

Overall, the department offers flexibility, and most students find career paths aligned with their interests, whether in academia, industry, startups, or management.

Q11. How is the peer group and competition level in this department?

Ans.

You will find a great peer group and healthy competition throughout the 4 years in this department. The student community is diverse, including:

- Passionate students deeply involved in research projects and publishing papers with professors.
- Active participants in campus activities, holding various positions of responsibility while managing academics.
- Students engaged in startup ideas and entrepreneurship.

The overall competition level is comparable to other departments. While the students are hardworking and intelligent, the competition is generally not as intense as in circuital branches. If you put in consistent effort, you can definitely stand out and excel.

Q12. How collaborative or competitive is the environment?

Ans.

The environment in this department is very collaborative. Students often work together on lab projects and group assignments, helping each other learn and succeed. While IITs are inherently competitive due to tough grading and a challenging job market, having a good peer support system makes the journey rewarding. Being responsible and disciplined while building friendships can help you navigate both collaboration and competition effectively.

Q13. Are there department-specific clubs, forums, or events?

Ans.

Yes, the department has a dedicated student society called **MatSoc (Materials Science Society)**. MatSoc organizes a variety of events throughout the year, including orientation sessions for new students, workshops, seminars, sports events, faculty-student interaction programs, and farewells. It serves as a great platform for students to engage with peers and faculty, build community, and enhance their academic and extracurricular experience. You can also find more about MatSoc on their Instagram handle **@matsoc**.

Q14. How well-equipped are the labs and infrastructure?

Ans.

The labs in the department are very well-equipped with modern instruments and facilities essential for both teaching and research. The infrastructure supports a wide range of experiments and projects, and many labs have cutting-edge equipment relevant to materials science. The staff are generally helpful, though experiences with them may vary. You can find more details about the teaching labs here: [IITK MSE Teaching Labs](#).

Q15. Are there department trips, seminars, or workshops?

Ans.

Yes, the department organizes trips, seminars, and workshops, though the frequency often depends on the professors. For example, we visited an injection molding factory in Lucknow. These events are sometimes arranged directly by the department or through the department society, MatSoc. Students can also request or help organize trips if they show interest.

Q16. General advice about the department.

Ans.

I was in a similar situation about 4 years ago, unsure whether to take Materials Science and Engineering (MSE) at a top-tier IIT like IIT Kanpur or choose a circuital branch at a second-tier IIT. While circuital branches at newer IITs might have better placement reputation, I can confidently say that if you work hard, you can secure even better placements from MSE at IIT Kanpur. Being a top-tier IIT, it offers a wide range of opportunities and the freedom to explore any domain of your interest.

If you are considering higher studies, IIT Kanpur is clearly the better choice. Moreover, the campus culture here is unmatched compared to newer IITs, making your overall experience much more enjoyable.

So, if you are unsure about your future goals, choosing MSE at IIT Kanpur is a wise option. You get ample opportunities to explore different fields before deciding your career path, which is invaluable.